CALIFORNIA
OIL WORLD

PUBLISHED TWICE A MONTH
FOR TIMELY, COMPLETE
CALIFORNIA OIL NEWS COVERAGE

• SECOND ISSUE
DECEMBER, 1945
VOL. 38 • NO. 24
WHOLE NO. 1694

PETROLEUM PUBLISHERS, INC.
MEMBER AUDIT BUREAU OF CIRCULATIONS
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California Oil World is published twice a month at 117 West 9th St., Los Angeles 15, California. Entered as Second-Class Matter, April 29th, 1944, at the post office at Los Angeles, California, under the Act of March 3, 1879. Subscription price $1 per year in U. S. and possessions, $2 in foreign countries, including Canada. Member of the Audit Bureau of Circulations.

December 31st, 1945
Telephone Number TUcker 2571

Washington Highlights

Prospects for a real knock-down down and drag-out fight between the oil industry and the Department of Justice over the antitrust suits pending against the major portion of the industry for the past five years have been virtually assured by both parties to the legal action.

Wendell Berge, assistant attorney general in charge of anti-trust division, strongly indicated recently that the department would not seek any compromise in the case and that he was opposed to the entering of a consent decree, a device which has been repeatedly used to resolve differences in cases involving the anti-trust laws.

The present cases, Berge, said, "raise many questions of the legality of practices in the oil industry. They must be settled once and for all."

At the same time it was learned that the American Petroleum Institute and the 22 major companies which were named in the department's charges have no intention of entering a plea of nolo contendre, as was done in a number of cases during the old Madison trials after the NRA had been declared unconstitutional.

Top officials of the companies and the A.P.I. have come to an agreement to make no concessions, but to fight the whole thing through to the Supreme Court if necessary to get a clean-cut decision on just what they can do or not do in industry practices.

The original complaint was filed by the department in 1940 and at that time some oil executives favored seeking a consent decree. However, in the intervening years while the suits were held up pending the end of the war, it has been decided that any compromise in the present battle would only add to current confusion with respect to future operations within the industry.

Meanwhile the department of Justice has filed a motion with the Federal Court asking that the defendants in the case be required to answer the original charges by February 18. This is in line with the original agreement, entered into at the request of Secretary Ickes when the original shortages were being felt. At that time, it was agreed that the government could reopen the case and require an answer at any time on 60 days notice.

While Tom C. Clark, the comparatively new attorney general, hails from the largest oil producing state in the union—Texas—there is no doubt that he will back Berge to the limit. Since he took over the department he has repeatedly said that there would be no change in the anti-trust policies under his administration. His former assistants in the anti-trust division, which he formerly headed, have reported that he has given orders to proceed with the case against the oil companies.

Clark's only concession has been in recommending a short delay on the grounds that difficulties in the industry relating to reconversion and labor troubles would warrant such action. The go-ahead has now been given and the preliminary battle of motions before the Federal Court has begun.

Actual trial of the case can hardly get under way before next fall or winter, since the filing and counter-filing of motions is certain to consume all of the time between now and the summer recess. Defendants in the pending case, which is the broadest ever filed against the oil industry, in addition to the API, include: Standard of California, Atlantic Refining, Cities Service, Consolidated Oil, Continental Oil, Gulf, Mid Continent Petroleum, Ohio Oil, Phillips Petroleum, Pure Oil, Shell Union Oil, the Skelly Oil Company, Socony-Vacuum, Standard of Indiana, Standard of Kentucky, Standard of New Jersey, Standard of Ohio, Sun Oil, Texas, Tide Water Associated, and Union Oil, as well as their subsidiaries.

* * *

A government commission is getting ready to head for the Elk Hills reservation shortly after the first of the year to determine what changes to make in present drilling and lease arrangements.

At the present time the Navy is doing exploratory work in the western portion of the reservation to determine whether those lands will yield sufficiently to compensate for full exploitation. The agreement with Standard of California, giving the company an allotment of 15,000 barrels per day, expires on the second of March. Commodore Greenman, in charge of Naval reserves, says that he is not yet, and will not be, pending a complete study of the situation, ready to say whether this allotment will be reduced or wiped out completely.

* * *

The Petroleum Industry War Council gave up the ghost at a final testimonial dinner for William R. Boyd, Jr., chairman, at a dinner in Washington in December.

About four hundred government officials, members of both houses of Congress and leading oil company executives attended the affair at which Secretary of the Interior Harold L. Ickes highly complimented Boyd for his wartime activities, but were somewhat confused as the secretary continually referred to the chairman of the expiring agency as "Sir William."

After considerable questioning it was discovered that the unofficial title originated during the recent tour of Europe on the world oil situation by Ickes, Boyd and a number of other government officials and oil company executives.

It seems that while in England they found that a number of top British oil men had been knighted for their part in the all-out effort of the Empire to obtain the maximum amount of oil for war purposes. One member of the party, referring to the pending anti-trust case against the American Petroleum Institute, of which Boyd is president, together with 22 other major oil companies, filed shortly before the war, said:

"Over there they knight them, but over here they indict them."

Since that time, Ickes has insisted upon calling Boyd "Sir William."

* * *

While the PIWC has finally passed on along with the WPB, the PAW and other war casualties, there is talk of an international organization to take over the foreign problems hitherto handled by the agency. However, difficulties in the path of the Council, or its international successor, make any early realization of this program extremely doubtful.

* * *

Incidentally, Bill Boyd and most of the oil men who have spent so much time in Washington during the war period, have repaired to their respective homes for the Christmas holidays. Most of them will be back on the 16th of January when the Senate Foreign Relations committee takes up consideration of the British-American oil treaty.

* * *

With the close of the war, headquarters of the API is scheduled to return in actuality as well as in name to New York. However, the industry organization will retain offices in Washington and the Division of Transportation will remain here permanently, under the leadership of B. Brewster Jennings. Jennings will retain his title as vice-president of API. He is also president of the Socony Vacuum Oil Co. The Production Division will maintain headquarters in Dallas, while Marketing and Refining Divisions will stay in New York.

* * *

One of the final actions of PIWC before its dissolution was a strong recommendation for prompt removal of price ceilings on all petroleum products to aid the industry in meeting the winter demands for fuel oil. In its final meeting before dissolution the Council issued a statement as follows:

"There is more than adequate crude oil production and refining capacity available to meet all currently indicated needs for petroleum products.

"On the basis of stated OPA policy of removing controls and letting competition regulate prices when products are in adequate supply, there is no reasonable ground for continuing to maintain price control on petroleum and its products.

"1941 industry prices, which are the basis for present petroleum product price ceilings, were set at a time when there was need for maximizing gasoline production. Today there is less demand for gasoline and substantially more for kerosene and various grades of fuel oil. However, the price strait-jacket prevents the fluctuation of prices on various products from functioning in the normal manner to readjust product yields and meet seasonal and other fluctuations in consumer demand. Mainly as the result of this, there is a serious prospective shortage of fuel oil to meet this winter's needs.

"Supplying this winter's heavy demands for fuel oil and serving the interests of the American people in having adequate quantities of all needed products available at all points can best be accomplished by the prompt removal of price control on petroleum and its products. The Petroleum Industry War Council strongly urges that this be done forthwith."

* * *

Ralph K. Davies, Deputy Petroleum Administrator for War and previously vice-president of Standard Oil Co. of California, was presented with the Civilian Legion of Merit by President Truman.

Davies, who started in the oil industry as a junior clerk in the Fresno office of Standard of California, rose to senior vice-president, his final post with the organization before leaving to take his place in the war effort. During the negotiations resulting in the signing of the final Anglo-American Petroleum Agreement in London in Sept., Davies served as chairman of the American group on the Joint Subcommittee which worked out the terms of the treaty.

California Oil Men Appointed to A.P.I. Production Division Committees for 1946

J. E. Sherborne, Union Oil Co., has been appointed vice-chairman

(Continued on Page 36)

Mud Control for Efficient Drilling Operations

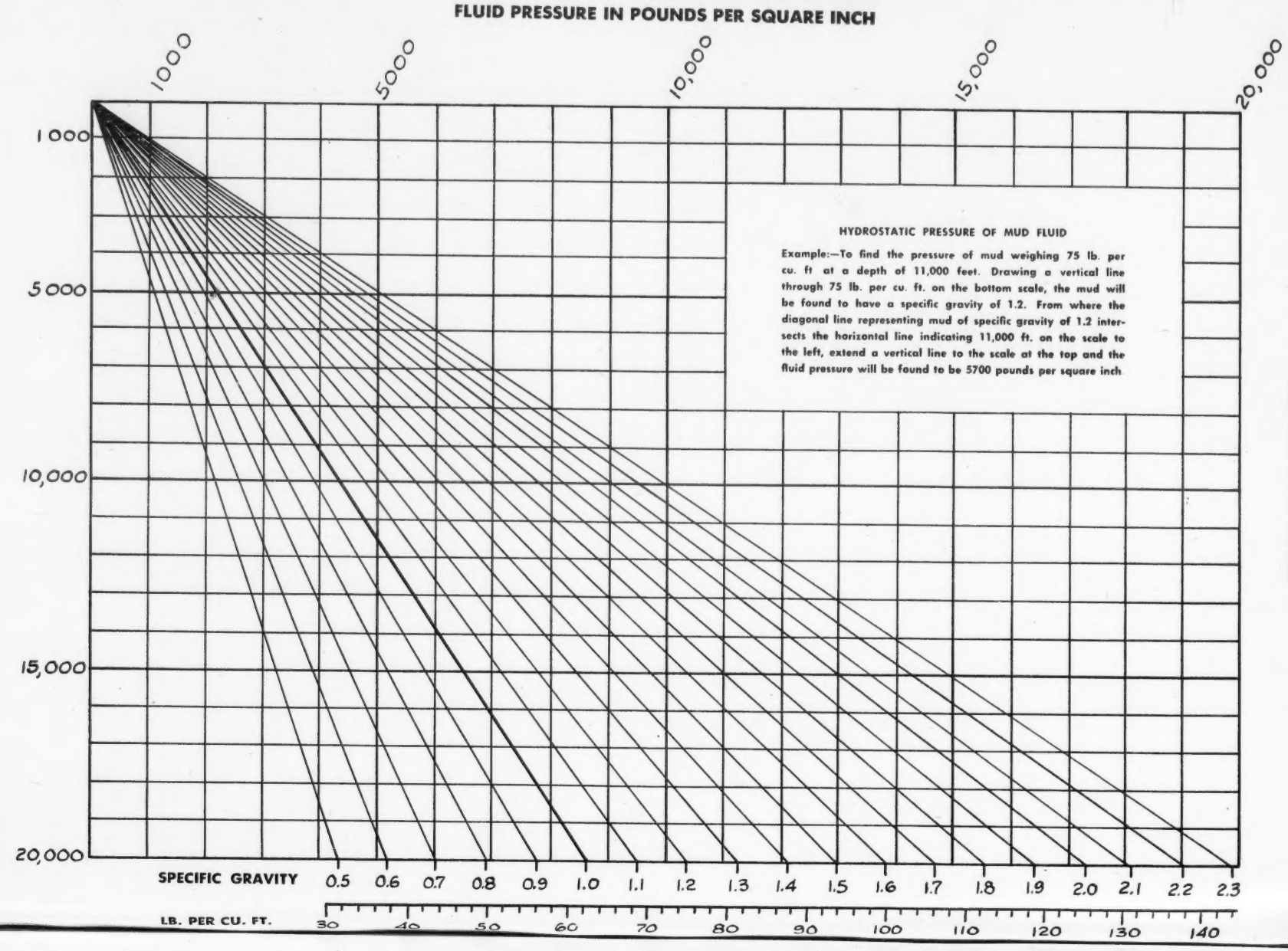
The best mud fluid possible to obtain under existing conditions is necessary for maximum efficiency in drilling operations. There are certain characteristics that the mud must have to meet specific requirements; but the requirements may change considerably during the drilling of a well, and a mud fluid that is good for one depth may not be adequate as the well gets deeper. Even when a mud has characteristics that are good for the drilling of a well from top to bottom, the mud itself may lose certain of its properties during the progress of drilling and may become an unsatisfactory fluid. In general, therefore, the mud fluid must be controlled to make sure it has the necessary properties to meet the requirements at the time it is being circulated in the well.

The functions of a drilling mud are well known but can be summed up briefly. Except for cooling the bit, which is one of the most important functions of the mud but can be obtained by pumping almost any fluid down the well, the functions of a drilling mud depend on certain properties given to the fluid by the materials which it contains. The positive functions (in addition to cooling the bit) are: removal of cuttings from the well and depositing them in the mud ditch; controlling gas, oil or water pressure in the formations drilled through; preventing caving of the walls of the well; lubricating the drill pipe, the wall of the well, the casing and the mud pumps; holding all solids in suspension, particularly during interruptions in drilling; checking corrosion; and facilitating the movement of pipe in the well. The negative functions are preventing the formation of a thick cake of mud on the walls of the well and the keeping of a harmful amount of water from entering the formation.

The source of materials for making a satisfactory base mud may sometimes present a serious problem. Local clays may have the properties for making a good mud but frequently the material must be transported a great distance to the well location. Admixtures will often have to be relied upon to meet the conditions encountered and in most cases the quantities of admixtures employed will have to be varied at times to meet changing conditions. Formations penetrated may add to or detract from the quality of the mud and the control of the properties of the fluid as the well progresses often requires greater consideration than the mixing of the fluid used when starting the well. Drilling requirements themselves may change considerably as greater depths are penetrated and specific properties may then have to be given to the mud to meet particular conditions. This is specially true of the weight which may have to be greatly increased if high pressure strata are encountered. Periodic testing should be done to secure data for conditioning of the mud and field testing equipment should be available for this purpose. Under certain circumstances where difficult problems are encountered it may be necessary to make more exhaustive tests, either in a laboratory if one is conveniently located or by taking portable equipment to the well if it is an isolated location.

The mud derived from the formations as the well is drilled will sometimes be the means of obtaining a satisfactory drilling fluid; at other times it may be very detrimental. One important factor in drilling mud is the colloidal content, and certain formations will frequently supply colloidal material to a mud that is deficient in colloids. A bentonite stratum may even deposit more colloidal matter into the mud stream than is desirable and in that case may necessitate treatment to reduce

Mixing mud in a pit with a Patterson-Ballagh mud gun designed for high pressure service.


FLUID PRESSURE IN POUNDS PER SQUARE INCH
1000
5000
10,000
15,000
20,000
DEPTH OF WELL IN FEET
1 000
5 000
10,000
15,000
20,000
HYDROSTATIC PRESSURE OF MUD FLUID
Example:—To find the pressure of mud weighing 75 lb. per cu. ft at a depth of 11,000 feet. Drawing a vertical line through 75 lb. per cu. ft. on the bottom scale, the mud will be found to have a specific gravity of 1.2. From where the diagonal line representing mud of specific gravity of 1.2 intersects the horizontal line indicating 11,000 ft. on the scale to the left, extend a vertical line to the scale at the top and the fluid pressure will be found to be 5700 pounds per square inch
SPECIFIC GRAVITY
0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
LB. PER CU. FT.
30 40 50 60 70 80 90 100 110 120 130 140

the colloid concentration. A prepared bentonite, however, will generally have to be added to the mud to maintain its colloidal properties; and when high pressures are encountered it will almost always be necessary to add weight material to the mud in order to offset the formation pressure. But when weight material is added, assurance must be made that the colloidal content is sufficient to hold the weight material in suspension.

Colloidal Properties

Even the heavy, inert material introduced into a drilling mud to give it weight thus depends on the colloidal property of the mud to make it effective. Except for the cooling action of the fluid, all functions of the mud are more or less related to the colloid content. Chemical treatment of mud fluid is, in the main, used to keep the colloids functioning. Conditioning of the mud (except for the control of weight) is thus obtained by the increase or reduction of colloidal concentration, by deflocculation of colloids, or by control of colloidal action. This applies to organic colloids as well as inorganic colloids, the use of organic colloids being a comparatively recent development in mud treatment for specific purposes.

Gel strength, a characteristic of the mud imparted to it by the colloidal material, is the ability, or measure of the ability, of a colloid to form gels. The proper colloids in the mud impart the property of gelation or thixotropy; these two words have come to have a synonymous usage in connection with drilling fluid; but there is a distinction. Thixotropy is a better term because, while gelation means the ability to thicken (or gel), when the mud is standing without movement or agitation, thixotropy carries the important extension of repeatedly becoming fluid on agitation and setting to a gel when at rest.

The thixotropy is indicated by the difference between shear or gel strength of the mud at the cessation of agitation and at the end of a period of quiescence. The measurement can be made by a shearometer or by a Etormer viscosimeter. Although an increase in viscosity usually accompanies an increase in thixotropy, the viscosity does not specifically indicate the degree of thixotropy. A high viscosity may result from a high concentration of inert solids and not from the colloidal properties of the mud.

The gel strength of the mud must be sufficient to prevent cuttings and other solids from settling to the bottom of the well. This holding of the solids in suspension is particularly important while circulation is suspended. Although this property is a factor in carrying the solids to the surface, it is important that the consistency of the mud fluid should be such as to allow the cuttings to settle out in the mud ditch. These apparently opposite purposes can be achieved by careful control of viscosity and gel strength and should assist, rather than hinder, the settling out of solids by mechanical means.

The removal of cuttings from the well, one of the essential functions of the mud fluid, requires an upward

This type mud gun has two mixing chambers and can be adjusted from horizontal to a 90° downward flow.

velocity to carry the cuttings up the well to the surface. This velocity may be great with muds of low viscosity; but with a mud possessing a finite gel strength, all cuttings up to a certain size will be removed from the well no matter how small the velocity.

Vibrating or shaker screens have long since proved their value in taking the cuttings from the mud after its return to the surface. It is customary to use one or two of these screens at a well, depending on the volume of mud fluid being circulated and the character of the formation being drilled. It is, however, impossible to expect the screen to take out sand made up of grains smaller than the screen openings. Some of this sand will settle out as the mud passes along the ditch but if the mud has a viscosity necessary to meet other operating conditions much of the sand will stay in the stream and go back into the well. This is particularly true if the sand is fine grained. While many formations penetrated are assumed to contain no sand, it is surprising how much sand can be taken from the mud at any time; and sand is always a detrimental agent in the mud stream.

Removal of Sand and Gas

Various means are employed for taking sand out of the mud stream. These range from settling tanks to many ingenious devices. One make of desander that is of comparatively recent design and that has been giving satisfactory service is shown in the accompanying illustrations. When using this equipment, the rotary mud, after passing through the shaker screen, is pumped through the desander. The force of the mud as it enters the desander causes the mud to whirl at a high rate of speed. The centrifugal force produced by the rapidly whirling mud effectively concentrates the sand at the outer edge of the whirling fluid from whence it is forced down to a sand discharge nozzle at the lower end of the desander. The mud is prevented from escaping through the sand discharger nozzle by a partial vacuum produced by syphon action of the clean mud as it flows from the desander through a long vertical discharge pipe. The operation is continuous as long as the mud is being pumped into the desander. There are no moving parts so wear is reduced to a minimum.

Sand is here being removed from the drilling mud by a Vernon-Corwin desander.

The desander may be placed at one side of the pump sump or may be directly over the sump. If a mud tank is used instead of a sump the desander is mounted on top of the tank. The mud is picked up from the sump by a centrifugal pump through a suction hose and discharged into the desander. The clean mud returns to the sump through the syphon pipe, the sand is discharged at the bottom of the desander through the discharge nozzle where a small jet of water prevents the sand from backing. The vacuum produced by the clean mud as is flows down through the syphon pipe is controlled by a vacuum relief valve and is maintained at from 12 to 15 inches to prevent the mud from flowing out the sand discharge nozzle. A screen prevents any large material from entering the sand discharge nozzle and blocking it. The pump is driven by a 7½ hp. electric motor, or suitable gas engine.

The retention by the mud of gas

(Continued on Page 19)

Here is shown an Overstrom mud screen above a Medearis portable flooded-suction tank, with portable ditches, guard rails, box for mud testing equipment, etc. Standing, left to right are: Frank Medearis, Milton Barnes and Harry Buchanan.

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And let us "highly resolve that these honored dead shall not have died in vain". Let each man, woman and child in this great land resolve that this peace shall endure, so that our children, and our children's children, may be spared the catastrophic consequences of another war.

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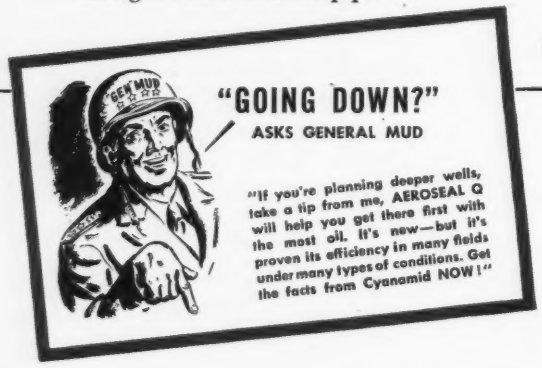
*Trade-Mark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Insulation...a Factor in Efficient Refinery Operation

By LARRY HANSON
President, Marine Engineering & Supply Co.

Economy alone warrants careful consideration of insulation in refinery construction; but with temperature control so necessary in modern refining processes, the insulation requisite to maintain temperatures and assure close control without variation is a definite factor in overall plant efficiency. Insulation is not a hit-or-miss proposition; the best type for a particular purpose must be selected and properly installed for applications ranging from furnaces and stills where temperatures may be well over 2000° F. to chillers that may operate at many degrees below zero. In modern refinery practice, temperature control is frequently of as much importance as saving heat; and proper insulation makes such control possible.

To be adaptable, insulation must be of such form as to be easily applied; it must have heat-resisting qualities sufficient to withstand successfully the highest temperatures to which it will be subjected; and it must be strong enough to assure long life. Other conditions peculiar to the specific application must, of course, be met.

The efficiency of commercial insulation depends primarily upon the small voids which it contains. In order to be most effective, the voids must be enclosed and must be so small that circulation within them and radiation across them will be at a minimum. Small void size is particularly important at high temperatures because of the rapid increase in convection and radiation with rise in temperature.

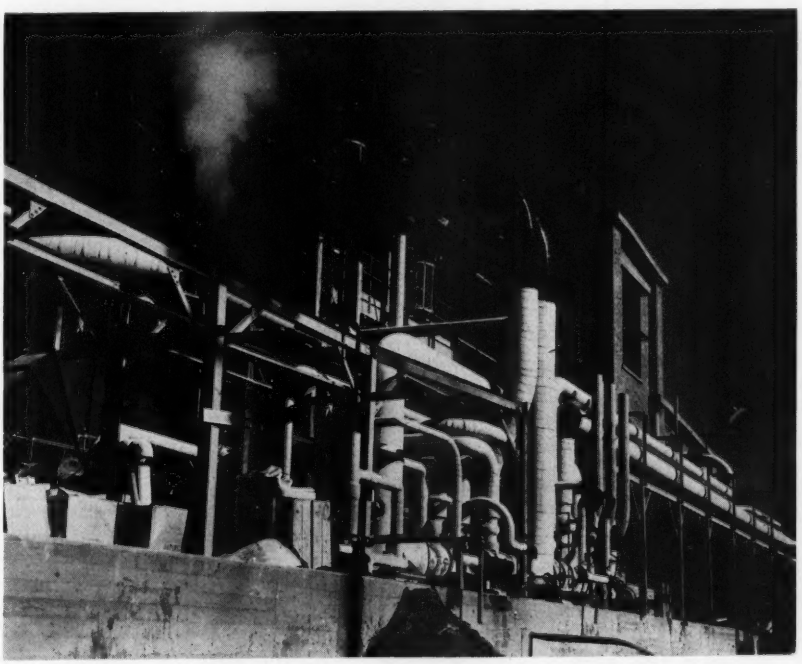
In refinery installations, three mineral products—asbestos, magnesium carbonate and diatomaceous silica—are widely used for high temperature insulation. These are utilized in the form of sectional pipe covering; insulating sheets, blocks, bricks and blankets; insulating cements, fillers and finishers; insulating papers and felts; and as lightweight aggregate for making insulating concrete. Refrigeration products consist of such materials as hair felt, "rock cork," and vegetable cork.

Space does not permit detailed descriptions of all kinds of insulating materials nor of the methods of application; so the discussion of types of insulation found adaptable for various units and equipment employed in refining operations is here based on the experience of one company* specializing in this type of work. Standard usages, however, have been evolved which are generally followed in oil refinery engineering practice except where there is some special condition requiring the minimizing of temperature drop or the conserving of heat which is unusually expensive.

Stills and Fractionating Equipment

For temperatures up to 600° F. magnesia blocks are widely used. These blocks are furnished either flat or curved in standard sizes and range from ½ in. to 4 in. in thickness. When the insulation is to be subjected to rough usage, sheets or blocks built up of laminated asbestos felts in which are embedded small particles of spongy cellular material meet the requirements and can be removed and replaced without injury. Being flexible, they conform to curved surfaces. Between 600° and 1600° F., blocks that are essentially a combination of diatomaceous silica and asbestos fibre, bonded together, have been found highly efficient. These blocks are furnished flat or curved and are 1 in. to 4 in. thick.

The ability of insulating material to resist heat is sometimes referred to as its refractory value and with an increase in refractory value it is generally true that the insulating value decreases. It is also usual that materials for higher temperatures are more expensive. It is logical, therefore, to select a material which has a refractory value high enough to withstand the temperature requirements, yet which also has high insulating value and is satisfactory in other respects. The application of this theory can be extended to combinations of insulations. If the drop in temperature through one layer of insulation is sufficient to permit the use of a second layer of



Recently completed steam power plant at Richfield's 100-plus Octane Refinery. This Power Plant can produce sufficient steam for a city the size of Spokane. The intricate pattern of pipes shown here is symbolic of the more than four hundred miles of piping that has been installed in this Richfield Refinery.

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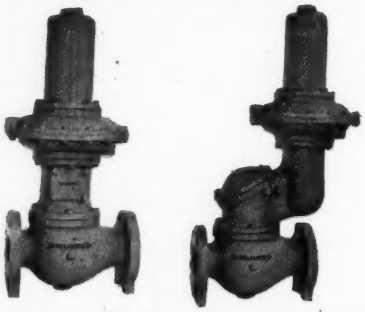

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The proper combination and thickness of insulating materials for stills and fractionating equipment is usually determined by considering the following factors:

1—The maximum operating temperature, in order to apply an insulation whose temperature will not be exceeded.

2—The average operating temperature, to determine the economical thickness of the insulation.

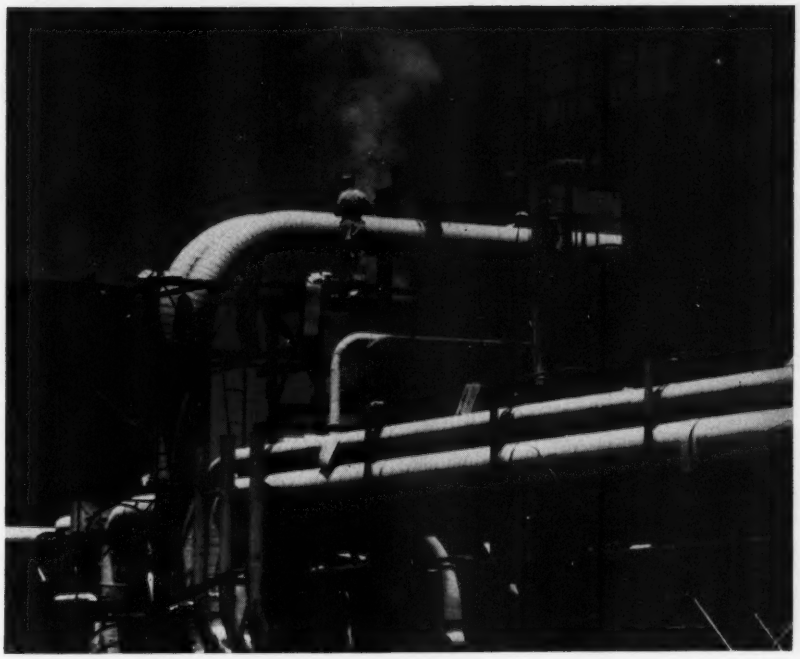
3—The degree of temperature control required, so that sufficient insulation may be applied to maintain the necessary operating temperature in the coldest weather.

The three types of insulation mentioned above, using the higher temperature insulation with one of the other two, will ordinarily solve any problem which might arise in connection with stills or fractionating equipment.

When insulating and sealing stills, ½-in. angle irons and clips are spot welded to the shell for attaching the insulating material. After the first layer is in place the cracks are filled with cement. Other layers of blocks are similarly applied and over the final layer galvanized mesh wire is stretched and wired securely. Over this is applied a rough scratch coat of insulating cement and when this is dry, a finish coat is troweled to a smooth, hard finish. The insulation is then weather-proofed. Heat is usually provided in the still during the application of the cement coatings to expedite the work and to prevent the greatest extent possible the cracking of the insulation from expansion.

When each still in a continuous battery of fire tube stills is operated at a different temperature, it is customary to strike an average and insulate the entire battery with the same thickness of material. This is an advantage because the operation of the battery is occasionally reversed.

Heat exchangers and partial condensers are insulated according to the range of temperatures expected in service in order to save the heat otherwise wasted in radiation. Vapor and residuum lines are similarly insulated when leading to heat exchanger equipment, as are also hot oil lines and feed lines.



Steam lines from the power house, Richfield Refinery.

Bubble towers are insulated not only to conserve fuel but also to maintain constant temperatures regardless of atmospheric conditions. The requirement is even more rigid in connection with separators or evaporators used for vaporization on tube stills. The reaction chambers or soaking drums used in the various cracking processes are designed to hold the hot oil at definite temperatures for a certain period of time and to meet this essential condition, care is necessary in selecting and applying insulation.

The insulating materials cited above—magnesium blocks, blocks or sheets of laminated asbestos felt, and bonded diatomaceous silica and asbestos fibre blocks—have been used effectively on all the distillation equipment, either singly or in combination in accordance with the temperature requirements. Rock wool blankets have also been employed in some instances for certain appplications but their use in refineries is not generally recommended.

The general method of applying insulation to towers involves the spot welding of angle clips circumferentially around the towers and the bolting thereto of curved iron bands. Expansion movements in steel towers sometimes cause trouble by cracking the insulation. This is especially true of the larger towers operating at high temperatures. Properly designed expansion joints tend to localize these effects upon the insulation providing space for expansion to be taken up without marring the outside finish.

Furnaces and Boilers

In furnace insulation, the obvious reason for using insulation is to limit heat flow from the hot interior in order to reduce the fuel consumption necessary to maintain the furnace temperature. With modern construction eliminating great thickness of brick it is necessary to use an efficient material to bar the flow of heat from the inside walls and arches. The heat retained by the insulation raises the mean temperature of the refractories and this minimizes the temperature differential between the inside and outside of the brick, lessening internal strains and reducing spalling. Likewise the wall cracks, caused by uneven expansion and contraction, are

fewer and smaller. The insulation itself, if properly applied, tends to seal cracks in furnace walls, thereby operating to prevent the infiltration of air or the extrusion of furnace gases.

When insulation is placed over the exterior of furnace brickwork, resistance is introduced in the path of heat flowing directly to the outside. This promotes heat flow along the walls, and cooler portions of the furnace are raised to a higher temperature. Sharp temperature changes are obviated and adjacent brickwork is protected against widely varying rates of expansion. Lower temperatures may be used in the heating zone and adequate temperatures still be maintained throughout all portions of the furnace setting. This saves fuel and still further prevents rapid deterioration of the refractories.

There are several methods of applying insulation to brick settings which are equally efficacious but which are applicable to different constructions. All these methods involve the use of insulating blocks or bricks. Care is always taken to leave the main supporting steel sufficiently exposed to air so that its strength will not be materially affected by the heat.

It has been found entirely satisfactory to apply blocks consisting essentially of a combination of diatomaceous silica and asbestos fibre, magnesia block, or bricks of a calcined semi-refractory type of diatomaceous silica (which may be used with temperatures as high as 2500° F.) between the refractory and buck-stays except at places of unusual thrust. In such locations the fire brick is carried through the insulation to the outside. When the brickwork is erected first, a space is left between the outside face of the brick and the inside face of the buckstays for the insulating blocks or bricks. In oil refineries, the casings are frequently erected before the brickwork. The insulation in such cases is applied next to the casing and the fire brick laid snugly against the insulation.

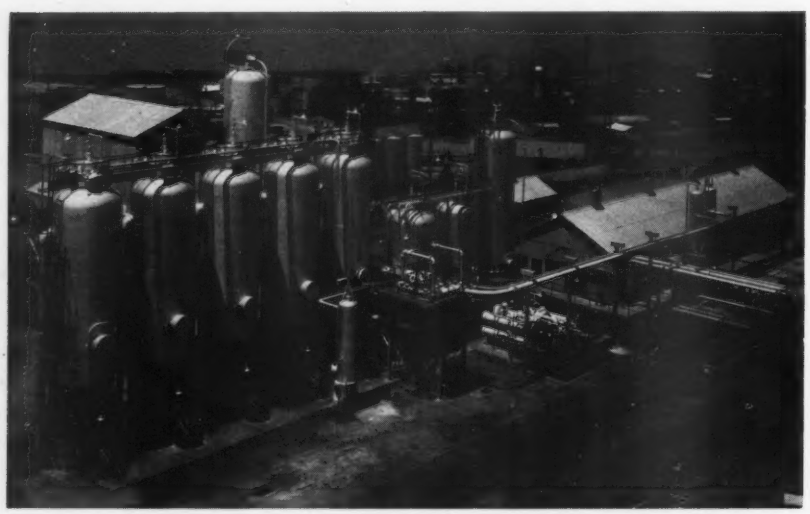
Furnace construction necessarily calls for considerable brickwork and steel projecting through to the outside of the insulation from the hotter parts of the furnace. Heat is thus conducted through brick and metal to the casing.

Modern furnaces are cased with steel plate or with a prepared material such as one composed of asbestos fibre and portland cement which are combined under tremendous pressure into a homogenous, dense mass having high strength and great durability. This prepared insulation comes in sheets ⅜ in. thick. Generally speaking, it is not a heat insulator but it has a conductivity low enough to prevent the casing from readily picking up the heat and carrying it along the surface to be rapidly dissipated in the air.

The designers of several well-known cracking processes have found that ordinary brick settings may be economically replaced by air-cooled walls and suspended arches over the hotter portions of furnaces. The function of air passages is to retain the heat recovered by the air, to furnish a suitable clearance for air travel so that adequate scrubbing action is combined with the elimination of undue friction loss, and to prevent the infiltration of air which would interrupt the flow over the surface to be cooled. The construction must be fireproof and able to withstand abrasion, ordinary mechanical impact and high temperature. A casing that meets these requirements is one made with the prepared material cited above forming outside and inside panels, and with blocks of bonded diatomaceous silica and asbestos fibre between.

Insulating concrete has proved highly effective for foundations and bases. When made with a calcined semi-refractory type of diatomaceous silica, this insulating material is placed over the concrete foundations and covered by one or more layers of fire brick. It is more effective than fire brick in resisting passage of heat; it will withstand temperatures of 1800° F. and has a crushing strength of 1000 p.s.i.

Tube plates, tube supports and tube doors can be insulated with this insulating concrete and with blocks like those used for the insulation of the furnace itself. In constructing the furnace, a refractory cement will bond the bricks together and will take up irregularities of shape. Fireclay is merely a filler and has no bonding strength or high temperature resistance; it shrinks badly, crumbles and blows out of the joints, exposing the edges of brick to the action of flame and ash. A furnace wall may be made to stand up against higher temperatures than the bricks themselves could otherwise withstand if heat is prevented from entering the setting through cracks and thus softening the bricks at some distance from the surface. Open joints also increase spalling because there is no possibility of an



General view of Union Oil Company's propane dewaxing and deasphalting plant. Chillers in foreground, solvent recovery system centrally located and compression plant in right background.

even temperature gradient from one face of the brick to the other.

The erosive action of oil flame is also an item of some concern. A setting with tightly sealed joints and with the pores of the brick filled by wash-coating with the proper refractory cement is the best protection possible to obtain. The wash-coating also tends to prevent disintegration of the brick by the action of furnace gases.

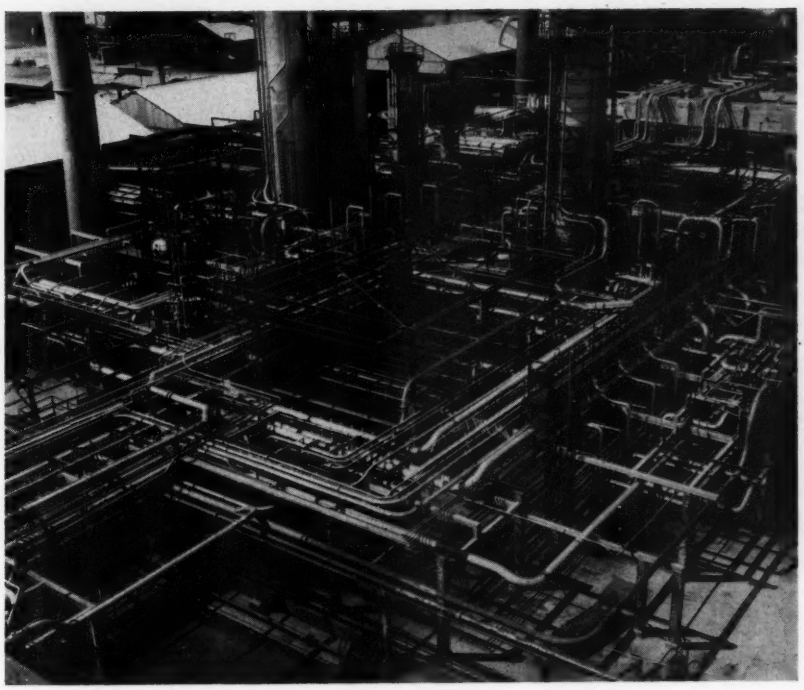
Where refractories have begun to spall, the deterioration may be slowed down considerably by a coating of refractory cement bonded to the interior of the setting. If the brickwork has failed locally, instead of replacing the destroyed brick it is frequently more economical to make a clean hole in the setting and pound in plastic fire brick material flush with the brick surface.

The growng practice of installing heat recovery apparatus in the path of flue gases still containing useful heat generally involves the use of economizers or air preheaters. Whatever form is employed, it is always important to exclude infiltrating air from the gas passages and to insulate all portions against reduction of temperature head. This is particularly essential where recirculation is used.

Boilers in refinery service naturally require insulation for efficient operation and while the different designs of boilers necessitate variations in the application of insulating materials, the general principles are the same as for furnaces.

Pipe Insulation

There are many kinds of insulating material being used for piping and the insulation which should be selected for a particular application depends on the requirements of the individual job. Asbestos-sponge felted pipe insulation is efficient for temperatures up to 700° F. It is built up of laminated asbestos felts in which are embedded small particles of spongy cellular material. Its laminated construction gives sufficient mechanical strength to withstand severe usage and vibration, which makes it particularly desirable around stills and cracking plants where pipe insulation is often subjected to rough treatment. It can also be taken off and placed on other pipe of the same size without deterioration from the consequent handling and transportation.



View showing layout of piping, towers and heaters, Union Oil Company Refinery.

The magnesia type of insulation is extensively used for steam lines where temperatures do not exceed 600° F.

For temperatures higher than those for which the above types of insulation should be used, a pipe insulation consisting of bonded diatomaceous silica and asbestos fibre can be employed. In some cases when this material is used, the asbestos sponge felted covering is placed outside to give mechanical protection and increase the insulating efficiency.

Sectional insulation is applied to the pipe with joints tightly butted and pointed up with an insulating cement. The insulation is wired securely to the pipe. When the insulation is thick and when made up in combination of more than one kind, it should be applied in two layers with both circumferential and horizontal joints staggered. Insulation on bends should be given a thin finishing coat of insulating cement to present a smooth, even surface. Flanges and fittings must be insulated in a manner similar to the line and coated with cement.

All insulation on indoor piping should be finished with a canvas blanket and, if desired, coated with paint or other protective covering. Insulation on outdoor piping, or where exposed to weather, should be protected with a waterproof jacket, the canvas being omitted.

Where it is necessary to make frequent inspections of hot oil vapor lines, particularly those which connect the cracking coil with reaction chambers in the various cracking processes, an asbestos pipe blanket can be used for temperatures up to 800° F. The usual pipe blankets are made of asbestos cloth on both sides filled with brown asbestos fibre quilted with wire-inserted asbestos cord.

Oil, asphalt, tar lines, etc., in which it is necessary to maintain temperatures above outside temperature to insure flow, are protected from cooling by means of small steam pipe running adjacent to the main pipe. The two pipes are insulated together.

Low Temperature Insulation

Refrigeration is much more costly than heating and the necessity for heavier insulation on low temperature work than is customary for

(Continued on Page 43)

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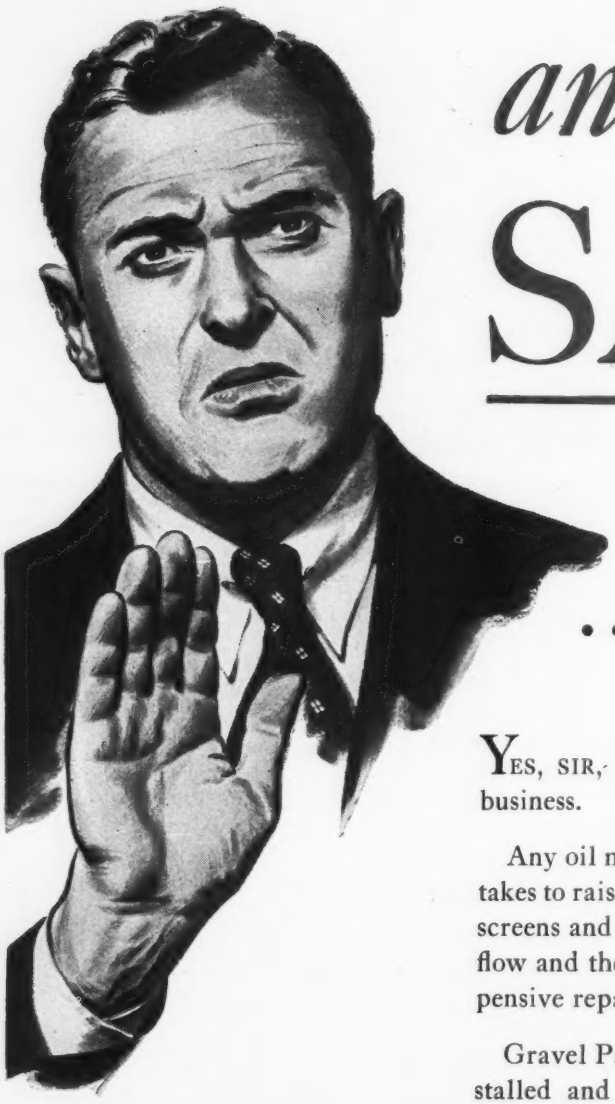

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The UOP MS-Type Catalytic Cracking Unit

By N. K. ANDERSON and M. J. STERBA
Universal Oil Products Company

INTRODUCTION

As a result of the experience gained through design and operation of numerous fluid catalytic cracking units built during the war for the production of aviation gasoline, UOP has been able to develop an efficient and simplified catalytic cracking unit to meet the smaller refiners needs.

The many improvements and simplifications embodied in the MS-type design have resulted in a marked reduction in investment cost, as well as substantial decreases in operating, maintenance, and utility requirements, so that this unit can now be installed and operated at a cost comparable with that of a thermal cracking unit of the same capacity. There has been no sacrifice in performance to realize these economies; in fact, there has been an actual improvement in processing efficiency. At the same time, the unit has retained all of the inherent advantages of the original fluid type operation which make it extremely flexible in regard to conditions at which it can be operated, or charging stocks which can be processed. All of the improvements incorporated in this new MS-type design have been fully demonstrated in pilot plants, semi-commercial scale, or commercially operating units.

As an illustration of the flexibility of the fluid process it can be pointed out that commercial fluid cracking units have been operated with reactor temperatures ranging from as low as 800°F. to as high as 1000°F. Stocks processed commercially have ranged from gasolines to topped crude fed directly to the catalyst section without pre-flashing. Various recycling operations and combinations of catalytic and thermal cracking operations have been thoroughly investigated.

The inherent flexibility of the fluid catalytic cracking unit plus the economies of the MS-type design combine to make this unit entirely practical for the smaller refiner who is faced with the problem of increasing the octane rating of his motor gasoline.

FLOW DIAGRAM

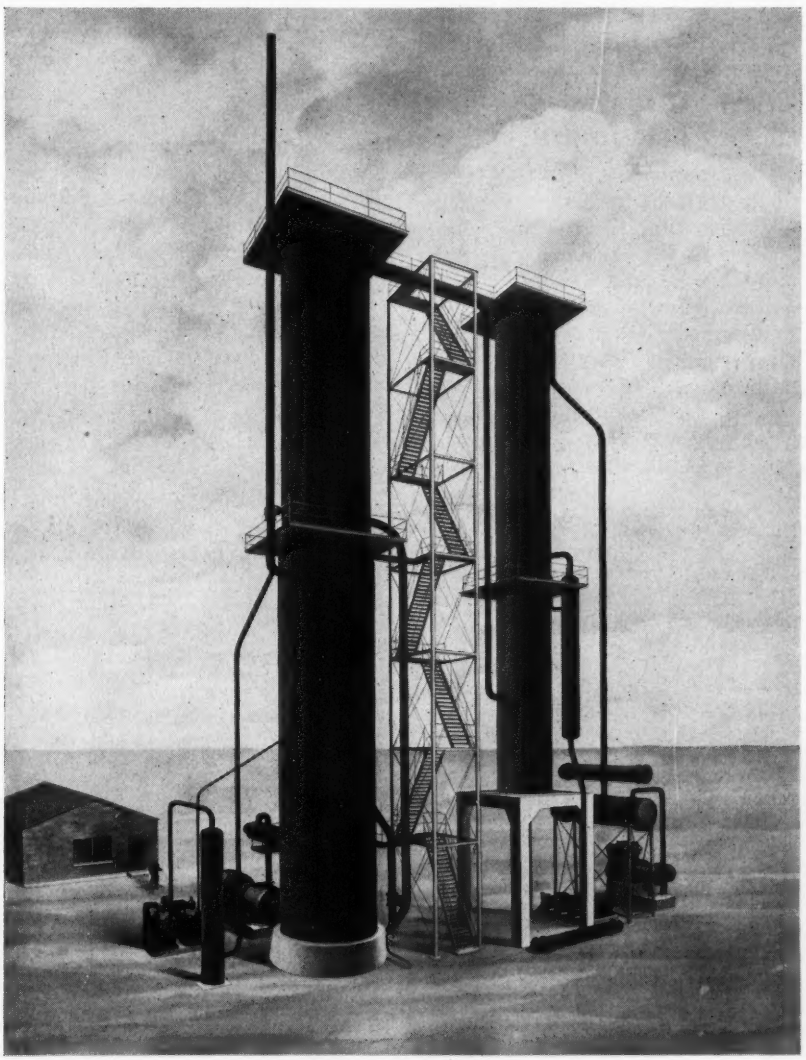
Briefly, the flow shown by Fig. 1 for the new MS-type unit is as follows:

The oil feed is charged as a liquid at the base of the reactor riser; hot catalyst from the regenerator enters this riser at the point of oil injection, supplies the process heat requirements, and is transported upward by the vaporized oil into the reactor.

Spent catalyst is continually withdrawn from the upper part of the reactor dense phase to hold the level in the reactor and is passed downward through the stripping section into the regenerator. Inert gas prepared by water scrubbing a small portion of the flue gas is used for stripping.

Catalyst flows downward through the regenerator counter-current to the air supplied at the bottom for combustion. Additional stripping of the spent catalyst is obtained in the upper section of the regenerator where the bulk of the flue gas from the combustion of coke in the lower sections contacts the incoming catalyst.

Regenerated catalyst flows from the lower section of the regenerator



UOP MS-Type Catalytic Cracking Unit

into the reactor riser at a rate controlled to maintain a constant reactor temperature. The regenerator flue gas is vented to the atmosphere through an internally mounted cyclone separator which recovers entrained catalyst and returns it to the regenerator dense phase.

The reaction products pass into the fractionator vapor line through an internally mounted cyclone separator which recovers entrained catalyst and returns it to the reactor dense phase. The vapors enter a conventional fractionating column where column bottoms, a side-cut stream, gasoline, and gas are prepared in the customary manner. Heat is recovered by circulating column bottoms through a steam generator and returning the oil stream to the fractionator at an intermediate point. Adequate facilities for stabilizing the gasoline and preparing polymerization feed have been provided.

DISCUSSION

The experience gained by Universal through the operation of numerous fluid catalytic cracking plants has been applied to the design of the new MS-type unit. This new development permits substantial reductions in installation costs as well as lower operating costs with improved performance. The major modifications in the MS-type unit as compared with the fluid unit of earlier design which have made these benefits possible are:

1. The regenerator and reactor have been combined into a single vessel which is erected as a self-supported column and is completely shop fabricated for moderate size units. In all sizes the heavy structure required in the earlier units has been eliminated.

2. The large regenerator riser has been eliminated; the regenerator standpipe is greatly shortened; and there has been a general elimination and simplication of small piping.

3. All equipment for secondary catalyst recovery, such as a Cottrell precipitator or an oil scrubber on the regenerating side, and a slurry settler or slurry recirculating system on the processing side, has been eliminated.

4. The efficiency of both the reactor and regenerator has been improved by the use of additional distribution grids in each section.

5. The air supplied for combustion passes through the regenerator countercurrent to the flow of catalyst.

The obvious simplification of the unit as indicated by the changes listed in the first three points results in a marked reduction in total investment, in maintenance charges, and in operating costs. This saving in itself is a major item. Then, paralleling this simplification process, there has been a redesign of the remaining elements of the plant to make them function with the greatest possible efficiency. Here the experience gained through operation of fluid catalyst plants has dictated the following changes:

1. Unlined pipe is used throughout the unit.

TABLE NO. I

TYPICAL YIELDS AND PRODUCT QUALITIES
UOP MS-TYPE CATALYTIC CRACKING PROCESSING MID-CONTINENT GAS OIL
ONCE-THROUGH OPERATION AT 65% CONVERSION

Catalyst	Silica-Magnesia	Natural	Silica-Alumina
Yields, vol. %			
Debutanized 400°F. end point gasoline	53.0	48.9	45.5
Cycle stock, 400°F.+	35.0	35.0	35.0
Butylenes	5.5	5.8	6.2
Butanes	5.5	7.4	10.9
Propylenes	3.8	4.8	6.8
Propane	1.9	3.4	3.7
C_2 and lighter gas, wt. %	1.9	1.7	1.7
Debutanized, 400°F. e.p.			
Gasoline (5-6# R.v.p.)			
Octane No. ASTM (F-2)			
Clear	79.1	80.3	82.1
+3 cc. TEL	85.2	86.5	87.7
Octane No. research (F-1)			
Clear	89.0	90.8	93.0
+3 cc. TEL	95.4	96.5	98.7
Cycle stock, 400°F.+			
Gravity, °API	26	26	26
C_2 and lighter gas			
Molecular weight	12	12	14
Heating value, Btu/cu.ft.	740	740	840

TABLE NO. II

PRODUCTION SUMMARY FOR ONCE THROUGH CATALYTIC CRACKING OF MID-CONTINENT GAS OIL

Catalyst Form	Microspherical Silica-Magnesia			Powdered Natural			Microspherical Silica-Alumina		
Type Catalyst									
Charge, bbl. per calendar day	900	2700	4500	900	2700	4500	900	2700	4500
Conversion, 100-vol. % cycle oil	65	65	65	65	65	65	65	65	65
C_2 and lighter, MCFCD	164	494	822	147	441	735	126	379	631
C_2 and lighter, 10^6 Btu/CD	121	363	605	108	375	541	106	319	531
Propylene, BCD	36	108	180	43	129	215	61	183	305
Propane, BCD	17	51	85	31	92	153	34	101	168
Butylenes, BCD	50	150	250	52	156	260	56	168	280
Isobutane, BCD	39	117	195	54	161	268	82	246	410
n-Butane, BCD	10	30	50	13	40	67	16	48	80
Debutanized, 400°F. e.p. gasoline, BCD	477	1430	2385	440	1320	2200	409	1230	2045
Cycle oil, BCD	315	945	1575	315	945	1575	315	945	1575
Over-all yields without polymerization:									
10# Rvp, 400°F. e.p. catalytic cracked gasoline, BCD	503	1510	2515	463	1390	2315	431	1291	2155
10# Rvp, 400°F. e.p. catalytic cracked gasoline, vol. %	55.9	55.9	55.9	51.5	51.5	51.5	47.9	47.9	47.9
Catalytic cracked gasoline F-2 ON clear	79.8	79.8	79.8	80.9	80.9	80.9	82.4	82.4	82.4
Catalytic cracked gasoline F-2 ON 3 cc. TEL	86.7	86.7	86.7	87.9	87.9	87.9	88.6	88.6	88.6
Excess butanes, BCD	63	189	315	84	252	420	117	350	583
Cycle oil, BCD	315	945	1575	315	945	1575	315	945	1575
Fuel gas, MCFCD	264	790	1317	282	845	1410	300	901	1501
Fuel gas, 10^6 Btu/CD	368	1103	1840	443	1330	2216	536	1610	2682
Over-all yields with polymerization:									
10# Rvp, 400°F. e.p. catalytic cracked gasoline, BCD	503	1510	2515	463	1390	2315	431	1291	2155
10# Rvp, 400°F. e.p. catalytic cracked gasoline, vol. %	55.9	55.9	55.9	51.5	51.5	51.5	47.9	47.9	47.9
10# Rvp motor polymer, BCD	54	162	270	60	179	299	72	217	362
10# Rvp. motor polymer, vol. %	6.0	6.0	6.0	6.6	6.6	6.6	8.0	8.0	8.0
Total 10# Rvp. gasoline, BCD	557	1672	2785	523	1569	2614	503	1508	2517
Total 10# Rvp. gasoline, vol. %	61.9	61.9	61.9	58.1	58.1	58.1	55.9	55.9	55.9
Excess butanes, BCD	19	57	95	38	113	188	66	197	329
Cycle oil, BCD	315	945	1575	315	945	1575	315	945	1575
Fuel Gas, MCFCD	224	672	1120	247	742	1237	232	694	1158
Fuel gas, 10^6 Btu/CD	276	828	1380	363	1089	1814	377	1130	1884
Catalytic cracked gasoline F-1 (research) ON clear	89.7	89.7	89.7	91.2	91.2	91.2	93.5	93.5	93.5
Catalytic cracked gasoline F-1 ON + 3 cc. TEL	96.3	96.3	96.3	97.2	97.2	97.2	99.5	99.5	99.5

2. The countercurrent regenerator results in only air passing through the main distribution grid. The distribution is simple and positive.

3. The system of catalyst flow control has been modified to reduce erosion on the control valves. Experience in the field indicates that these changes have eliminated this difficulty.

4. The design of the cyclone separators used in the new unit is such that maintenance is a minor item.

5. A monolithic regenerator lining of refractory cement has replaced the former brick lining.

All of the simplifications and mechanical changes noted above result in investment, maintenance, and operating economies which are of fundamental importance in adapting the fluid catalyst plant to the smaller refiners' needs.

IMPROVEMENTS IN EFFICIENCY

It has long been felt that more effective use could be made of the catalyst in the reactor both in regard to conversion and product distribution. It has been found that the installation of additional grids achieves both purposes: first, it permits running at higher space velocities for a given conversion; second, it improves the product distribution by giving more gasoline and less gas and coke at a given conversion. Both effects are quite appreciable. The grids function to prevent circulation of catalyst and reaction products (principally gasoline) from the top of the reactor dense phase toward the bottom. The circulated reaction products acted to decrease the effective oil partial pressure and hence, decreased conversion; at the same time, recirculated gasoline was cracked further to gas and coke, resulting in a loss of yield. The installation of additional grids has markedly improved the processing efficiency of the reactor.

The stripper has been completely redesigned and several installations indicate considerable improvement resulting from the changes. It has been so arranged in the reactor that flow of spent catalyst from the reactor dense phase into the stripper

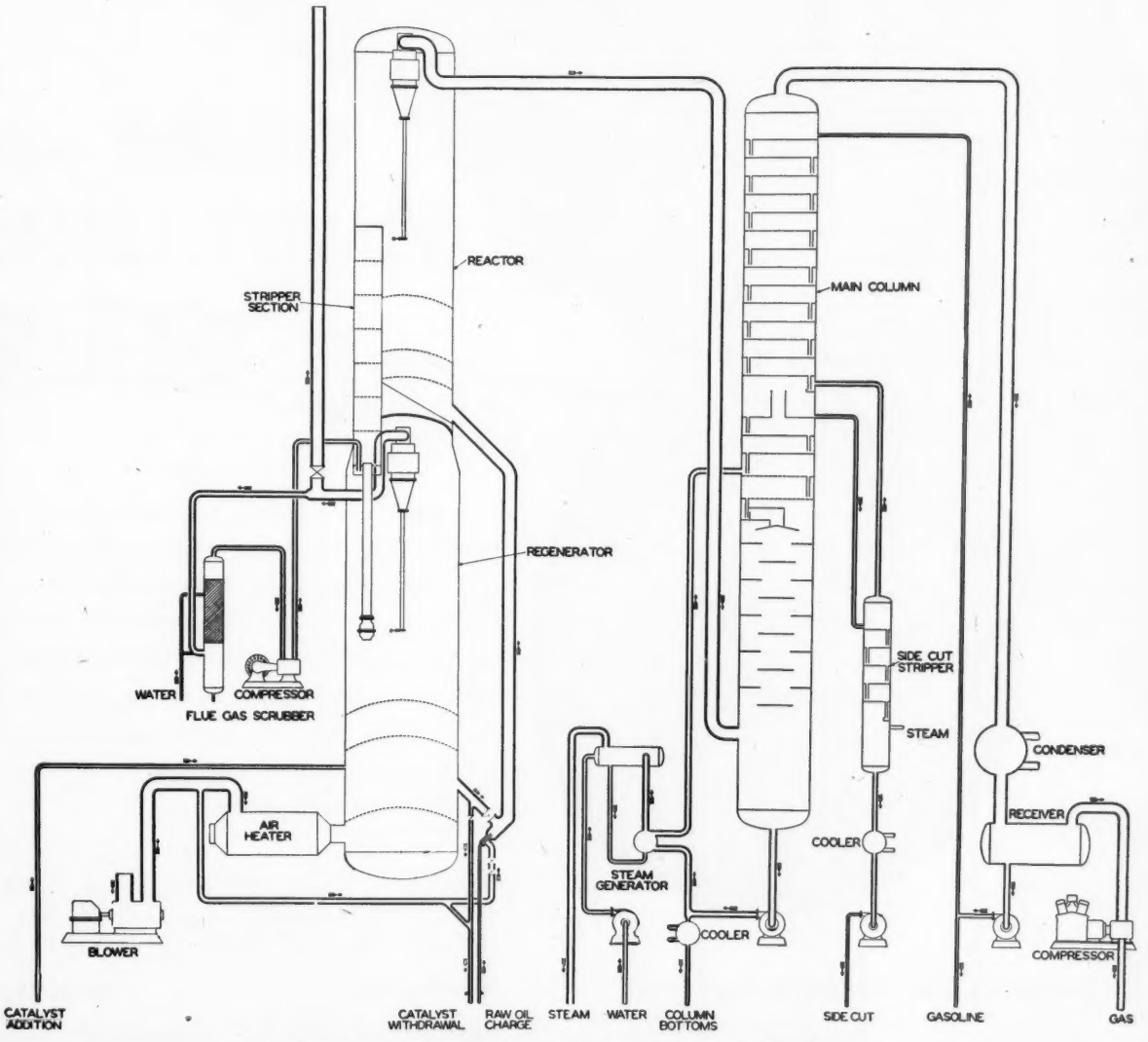


Figure 1 Flow Chart of UOP MS-Type Catalytic Cracking Unit.

Squeeze

VOLUME *and* GRAVITY LOSSES

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One of the outstanding characteristics incorporated in every Tret-O-lite formula is the ability to function with the utmost demulsification efficiency while holding gravity and volume losses to a minimum. Oil producers everywhere obviously recognize the value of this highly desirable asset common to all Tret-O-lite compounds . . . that is why you see the familiar red drums on so many leases wherever you go. There is a Tretolite field representative in your area—consult him about your crude oil emulsion problems.

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TABLE NO. III
SUMMARY OF OPERATING COSTS FOR UOP MS-TYPE CATALYTIC CRACKING UNITS

	Microspherical Silica-Magnesia			Powdered Natural			Microspherical Silica-Alumina		
Charge throughput BCD	900	2700	4500	900	2700	4500	900	2700	4500
Operating costs per calendar day:									
1. Operating supervision @ $350 per month	$ 11.70	$ 11.70	$ 11.70	$ 11.70	$ 11.70	$ 11.70	$ 11.70	$ 11.70	$ 11.70
2. Operating labor @ $1.20 per hour (average)	86.40	115.20	115.20	86.40	115.20	115.20	86.40	115.20	115.20
3. Maintenance labor and materials	66.00	132.00	182.00	73.00	146.00	269.00	66.00	132.00	182.00
4. Utilities	48.70	114.10	164.90	51.70	123.10	176.50	48.70	114.10	164.90
Net steam @ 25c/M lb. Circ. water @ 2c/M gal. Fuel @ 15c/MM Btu Electricity @ 1c/KWH									
5. Laboratory (additional) labor and chemicals	48.80	48.80	48.80	48.80	48.80	48.80	48.80	48.80	48.80
6. Catalyst	67.50	202.50	337.50	27.00	81.00	135.00	67.50	202.50	337.50
7. Royalty	45.00	135.00	225.00	45.00	135.00	225.00	45.00	135.00	225.00
8. Taxes and insurance	22.00	44.00	61.00	25.00	49.00	90.00	22.00	44.00	61.00
	$396.10	$803.30	$1146.10	$368.60	$709.80	$1071.20	$396.10	$803.30	$1146.10
Cost per barrel charge	44.0c	29.8c	25.5c	41.0c	26.3c	23.8c	44.0c	29.8c	25.5c

can occur only at the top of the reactor dense phase while the level is allowed to vary. This gives a true top drawoff of spent catalyst from the reactor and obviates by-passing of regenerated catalyst and unconverted raw oil into the stripper. This same feature enhances the effect of the additional grids in the reactor.

To improve the primary function of the stripper, i.e., to remove oil vapor from the spent catalyst going to the regenerator, the geometric proportions have been changed to give a stripper with a high length to diameter ratio; in addition, the stripper has been staged by adding grids. Both mechanical changes result in a marked improvement in stripping of spent catalyst by reducing "end-over-end" mixing.

With the countercurrent flow of catalyst and air through the staged regenerator it has become possible to improve its efficiency. The countercurrent flow makes feasible complete oxygen utilization with the additional feature of another period of hydrocarbon distillation and stripping of the spent catalyst in the upper section of the regenerator where the bulk of the flue gas from the combustion of coke in the lower sections comes in contact with the incoming catalyst. These points, together with the redesign of the reactor which improves the product distribution, permit a substantial reduction in regeneration requirements, both in vessel size and in air quantity.

The more favorable carbon-oxygen relationship in this staged regenerator results in an increased carbon burning rate despite the considerably lower average temperature of the dense phase. In addition, the regenerator is designed to run under pressure which further increases the carbon burning rate.

CATALYST ACTIVITY

This increase in burning rate, at a given temperature, effected by staging the regenerator with counter-current operation at a higher pressure, permits an appreciable reduction in the volume of catalyst required in the combustion zone. This point is directly related to the question of catalyst consumption in the cracking process. Hence, at this time the general case of catalyst deactivation and mechanical losses will be considered.

Catalyst deactivation is primarily a function of high temperature plus steam, when no substantial contamination of the catalyst is occurring. The steam can be either that adsorbed and occluded by the catalyst in the present strippers or that formed in the regenerator by the combustion of hydrogen-bearing catalyst deposits; the high temperature zone is in all cases the regenerator.

The source of steam in the first instance can be eliminated by going to inert gas stripping. This has been done, with a simultaneous redesign of the stripper to permit low stripping gas rates in order to avoid overloading the gas concentration equipment.

In the case of steam from combustion the effect can only be minimized. This was accomplished first by improving the stripping of the spent catalyst which reduces preferentially the amount of hydrogen-rich material entering the regenerator. Second, it was done by taking advantage of the counter-current flow of catalyst and air to stage the regenerator. There are three stages; at the top, there is a low temperature section with little or no combustion, acting as an additional stripping and hydrocarbon distillation zone; next, a zone of moderate temperature wherein the remaining hydrogen-rich material is burned with the least ill effect; and finally, a small high temperature zone where the combustion of low hydrogen coke takes place.

The above-given features of the MS-type unit substantially decrease

TABLE NO. IV
SUMMARY OF OPERATING COSTS FOR UOP LIQUID FEED ATALYTIC POLYMERIZATION UNITS
(To complement Catalytic Cracking Operating Costs in Table III)

		3	4	5	6	7	8	9
10#,Rvp polymer produced BCD		162	270	60	179	299	72	217	362
Operating costs per calendar day:									
1. Operating labor @ $1.20 per hour (average)	$ 28.80	$ 28.80	$ 28.80	$ 28.80	$ 28.80	$ 28.80	$ 28.80	$ 28.8	$ 28.80
2. Maintenance labor and materials	8.00	10.30	15.00	8.00	10.30	15.00	8.00	10.30	15.00
3. Utilities	15.60	40.20	65.40	17.00	44.00	72.10	19.80	52.70	86.70
Steam @ 25c/M lb. Circ. water @ 2c/M ga Fuel @ 15c/MM Btu Electricity @ 1c/KWH									
4. Laboratory (additional)	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
5. Catalyst	6.70	20.20	33.60	7.40	22.30	37.20	9.00	27.00	45.10
6. Royalty	10.10	30.20	50.40	11.10	33.40	55.80	13.45	40.50	67.60
7. Chemicals	3.80	11.40	18.90	4.20	12.55	21.00	5.00	15.20	25.40
8. Taxes and insurance	6.20	8.00	11.70	6.20	8.00	11.70	6.20	8.00	11.70
	$ 87.20	$157.10	$231.80	$ 90.70	$167.35	$249.60	$ 98.25	$190.50	$288.30
Cost per gallon 10# Rvp polymer produced	3.85c	2.31c	2.04c	3.60c	2.22c	1.99c	3.25c	2.09c	1.90c

the rate of catalyst deactivation. Their effect is augmented by the lower average regenerator temperature and the decrease in volume of catalyst held in that vessel resulting from the higher carbon burning rate realized by the installation of grids and the higher operating pressure.

After evaluation of the above-indicated reductions in the rate of loss of catalyst activity, the emphasis on the question of catalyst consumption becomes one of reducing mechanical losses. In view of this, the development of the MS-type catalyst assumes particular importance. This type of catalyst is made in the form of microspheres, extremely resistant to attrition, small enough to be fluidized easily, and large enough to make recovery by a cyclone separator very simple. Furthermore, the abrasion of metal parts is considerably less by the MS-type catalyst when compared to ground powder. Performance tests have verified the desirable properties of the microspherical form and all evidence points to a well balanced catalyst which will minimize the rate of replacement.

CATALYSTS

The most simple design of the MS-type unit is based on the use of the microspherical synthetic catalyst (MS catalyst). However, a catalyst in the powdered form, either synthetic or natural, can be used with certain additions to the basic plant design. Two synthetic MS-type catalysts, silica-alumina and silica-magnesia, are available. Silica-alumina catalyst would be used if maximum octane rating is the primary consideration. The gasoline yield with silica-magnesia catalyst is substantially higher but the octane rating is lower. Because of the lower cost per pound of the natural catalyst its use should also be considered. This catalyst gives a gasoline yield and octane rating intermediate to the values obtained with the synthetic catalysts but with a higher coke production and catalyst replacement rate. Economic considerations of market requirements and operating costs will govern the choice of catalyst.

YIELDS AND COSTS

The preceding tables have been prepared in order to give a comprehensive picture of the yields, productions, and operating costs of the MS-type catalytic cracking unit.

Yields and product qualities obtained in a once-through operation on a typical Mid-Continent gas oil with each of the three catalysts at a constant conversion of 65 per cent and a constant reactor temperature are summarized in Table I.

In order to illustrate the application of the MS-type catalyst cracking unit, there is shown a summary of the production and operating costs for three sizes of operations with each of the three catalysts. This study is based on MS-type units having gas oil charge capacities of 1000, 3000, and 5000 barrels per stream day with an on-stream efficiency of 90 per cent.

The production summary with and without subsequent polymerization of the C_3-C_4 olefins appears in Table II. The operating costs for the catalytic cracking units are given in Table III. A summary of operating costs for the complementing UOP polymerization units is presented in Table IV.

Operating costs for the catalytic cracking units are based on receiving a gas oil charge stock and cover the entire operation of the unit through absorption, debutanization of the catalytically cracked gasoline, and preparation of a liquid polymerization feed. The various items of cost together with the corresponding rates used in the estimate are listed separately in Tables III and IV. The catalytically cracked gasoline can be finished in almost all cases with no treatment other than a caustic wash and the addition of inhibitor.

SUMMARY

In closing, it should be pointed out that the greatest single advantage of the fluid type catalytic cracking unit is its flexibility. Commercial fluid units have been operated with reactor temperatures ranging from as low as 800°F. to as high as 1000°F. Stocks processed commercially have ranged from gasolines to topped crude fed directly to the catalyst section without preflashing. Various recycling operations and combinations of catalytic and thermal cracking operations have been thoroughly investigated.

The many improvements and simplifications found in the MS-type design have reduced investment and operating costs until they compare favorably with the costs of a thermal cracking unit of the same capacity. This has been accomplished while retaining all of the inherent advantages of the original fluid type operation and improving its processing efficiency.

The economies and improved performance of the MS-type design with all of the flexibility of the fluid cracking process make this unit entirely feasible for the smaller refiner who is faced with the need of raising the octane rating of his motor gasoline.

C. N. G. A. Elects 37 New Members

The following applications for membership in the California Natural Gasoline Association were recently approved: D. W. Anderson and C. A. Perry, The Texas Company; K. W. Barnhart, Southwestern Eng. Co.; W. J. Beckett, Bushnell Equipment Co.; R. H. Clarke and O. C. Mullen, Richfield Oil Corp.; W. D. Cleghorn, Midwest Pipe & Supply Co.; E. D. Curtis, Western Pipe & Steel Co.; B. K. Eckerson, Calif. Research Corp.; B. M. Holt, J. A. Gordon and L. S. Kelsey, Union Oil Co.; G. Hetherington, Jr., and J. Starbird, Western Gulf Oil Co.; E. L. Kay, Pacific States Oil Co.; T. Kelly, Cooper Bessemer Corp.; R. C. Kendig, Shell Oil Co.; W. A. Kirk, Jr., California Southern Oil Co.; T. H. Mahler, A. O. Smith Corp.; H. J. Maxwell and M. B. Standing, Standard Oil Co.; H. Menard, Ohio Oil Co.; K. Miller, California Oil World; O. C. Nelson, Del Valle Gasoline Co.; M. Ponedel, Wilshire Oil Co.; F. J. Renner, Foxboro Co.; J. R. Spencer and E. W. Van Ness, Tide Water Assoc. Oil Co.; B. H. Swartz, U. S. Flexible Tubing Co.; G. V. Vail, Southern Calif. Gas Co.; A. G. Zima, International Nickel Co.; T. E. D. Holbrook, Republic Supply Co.; M. A. Grizzle, Bethlehem Steel Co.; A. F. Durando, Flour Corp.; J. A. Millen, Southern Calif. Gas Co.; G. T. Pearson, Continental Oil Co.; and W. C. Sheldon, Ohio Oil Co.

Mud Control of Efficient Drilling Operations

(Continued from Page 6)

which is entrained during drilling often is a source of considerable trouble. Unless the mud is able to release the gas before returning to the well, that mud will become gas cut and the hydrostatic head of the fluid column will be reduced. A thick mud will gas cut more easily than a thin mud. The gas may be entrained as (1) microscopic bubbles, (2) in true solution, or (3) absorbed on the clay colloids. As the fluid column with entrained gas approaches the surface, the hydrostatic pressure becomes less and the bubbles expand, thus lessening the weight of the column.

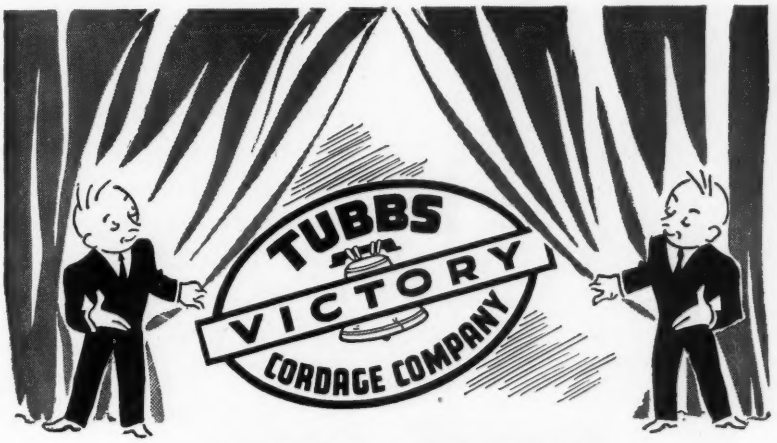
To reduce gas cutting in the well, the mud must be thin enough and with a sufficiently low gel strength to release the gas readily through the use of shakers, baffle towers or vacuum degassers. Chemical treatment has been proposed to prevent the formation of a stable gas cut mud. Gas-bearing formations should be drilled slowly so that there is the minimum amount of gas in the mud in the well.

Unfortunately the reduced weight of the mud column caused by gas generally occurs at a time when a light weight mud is most dangerous. The shaker screens aid materially in releasing gas from the mud fluid but when the gas is in great volume or difficult to release, some form of degasser becomes necessary. There are many types of degassers ranging from simple inclined baffle troughs with steps over which the gasified mud flows by gravity, to cylindrical tanks in which nozzles and baffles are used and in which a vacuum is sometimes carried.

Weight Control

When control of gas, oil or water pressure in formations drilled through is necessary, weight material is added to the mud. As long as the hydrostatic pressure of the column of drilling mud in the well is higher than the fluid pressure in the formation, the pressure medium in the formation will be kept under control. Once the differential pressure of the hydrostatic head is removed, the safety factor is lost and the formation pressure will push the mud out of the hole unless a blowout preventer or other mechanical equipment is adequate to cope with the emergency. The safety factor of the fluid column may be lost by encountering increased differential pressure in the formation or by the fluid column becoming gas cut. With gas cut mud the unit weight of the mud is decreased and this reduces the hydrostatic head exerted by the fluid column. While this reduction in weight is at first only at the top of the column, it proceeds downward as mud leaves the well by "geyser" action. The safety factor may also be lost by a reduction in pressure caused by pulling drill pipe if the mud has a very high gel strength.

Weight material, such as Baroid which consists of a specially processed, pulverized barytes, is added to the mud fluid in an amount that will give to the mud the specific gravity requisite for overcoming the formation pressure expected if gas, oil or water is encountered. In most cases



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PARDON OUR ENTHUSIASM---

but we want to give you an actual case record of the Globe Side Hole Cutter. It is one of many, but typical of conditions encountered in hard formations, and a record which will prove that this new tool is the most important drilling aid in many years.

FORMATION, Hard Shale and Lime. The Globe Side Hole Cutter was run in a well that had been drilled to 7,715 feet, in which several types of 8¾" rock bits were used after reaching 4,000 feet. None of these bits ran more than 17½ hours or drilled more than 37 feet of hole before the Globe Side Hole Cutter was used, and all were losing as much as ¾" in gage.

An 8¾" Side Hole Cutter was run in this well, and first reamed 21 feet to actual bottom. In combination with a rock bit it then drilled and reamed 16 feet, and when pulled the bit measured 8½", having lost ¼" in gage. The Globe Side Hole Cutter measured a full 8¾".

The same Globe Side Hole Cutter was run in again and went directly to bottom, showing that the hole had been reamed to full gage on the previous run. The drilling bit and Side Hole Cutter in combination drilled and reamed 69 feet in 31¾ hours on this run, an increase of nearly 100% in both footage and operating time over any previous run. When pulled, the Side Hole Cutter measured only 1/32" under its original size during the 69 foot run.

Used for reconditioning old holes, and run from top to bottom in new holes. Maintains full gage hole all the way to bottom. Stabilizes the drilling bit and prevents the hole from going off vertical in any formation. Extraordinary reaming ability due to 10-12 point side hole contact, in contrast with the 3 point contact of ordinary reamers. Eliminates the necessity of scrapers and reamers. Assures faster drilling, longer runs, lower drilling costs.

There are many records that prove the Globe Side Hole Cutter is indispensable to speed, efficiency and economy in modern drilling practice. Write or call any Globe office or distributor for detailed information.

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E. B. Wycoff Bit Shop . . . . . Great Bend, Kansas

GLOBE SIDE HOLE CUTTER

the weight material is mixed with sufficient colloidal material to insure its suspension in the circulating fluid, the mixing usually being done in the manufacture of the product. However, when the mud in service has a high colloidal concentration, the heavy inert solids alone are employed. Although mud derived from the formations as the well is being drilled may provide the necessary colloidal content for satisfactory drilling fluid, it will not always supply the weight required for even medium depth drilling; and it can never be relied upon without the addition of weight material when high pressures are encountered.

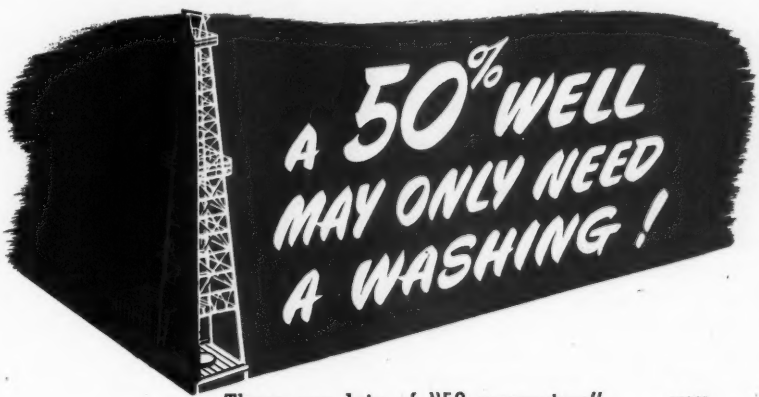
Mud weight requirements will be governed, of course, by the formation pressures encountered. Formation pressures follow to a great extent the hydrostatic head of water at the depths considered but there are many high pressure areas where the formation pressures are greatly in excess of this head. The pressure exerted by a column of mud fluid of any given specific gravity for depths to 20,000 feet can be determined from the accompanying graphs.

Testing of mud weight must be done frequently enough to make sure that danger from the effect of high pressure is eliminated when the well is being drilled through zones where such a pressure may occur. The testing is usually performed with a mud balance, a hydrometer or a bucket-and-spring balance, the type of equipment used being in accordance with the kind available or the desire of the mud engineer. There are also instruments for continuous indication of mud weight and by means of these the specific gravity of the fluid as it returns from the well can be read at all times.

Control of weight frequently requires a thinning of the mud fluid and this is ordinarily done by the addition of water. Before thinning, tests should be made to make sure the addition of water will not impair the other necessary properties of the mud and to determine whether other treatments, such as the addition of colloidal material, removal of inert solids or the uses of chemicals to condition the mud, is necessary. Gas cutting of the mud is often a cause for increasing the weight and when this is the case, measures should be taken to put the mud into as good condition as possible before adding the weight material.

In some instances the mud made from the formation will cause a rapid rise in viscosity which requires the reduction by the combined use of water and chemical thinners. Under such conditions the original weight of the mud can be restored by the simultaneous addition of an adequate amount of weight material. Weighting agents should possess high unit weight so that their bulk will not unduly increase the viscosity of the mud. Increase in viscosity due to inert material is a function of the volume occupied. The weight material should be non-corrosive, non-abrasive and chemically inert.

Weighting agents are sometimes used with water to make synthetic muds of a desired weight, the weight not necessarily being heavy. The



There are lots of "50 percenters" . . . you know them. Fair wells, paying their way — but not as good as they should be. Their tests gave promise of much greater production; nearby wells are bringing in twice as much from the same formations. And, surprisingly enough, there's only one thing the matter with most of them.

They need washing! Yes, even if they were washed when they were brought in. The experience of McGaffey-Taylor, gained in washing hundreds of wells in nearly every field in California, provides a simple, tested prescription: wash those disappointing wells with an M-T Pressure Washer. The results? Increased production in most wells, greatly increased production in many, phenomenal increases in some. Get the full details —

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object in such a case is to obtain a mud with superior wall building properties and one that is more stable because of the higher percentage of gel-forming concentrated colloids permitted by the substitution of high specific gravity weight material for lower specific gravity clay. The colloidal content of such a mud is usually provided by previous mixture with the weight material itself but colloidal material can, of course, be added separately if desired.

Other Mud Characteristics

There are many other factors to consider in the control of drilling mud. Among these are the wall-building properties of the mud, the water loss, the use of chemicals to maintain control, the effect of hydrogen-ion concentration or pH, and the preparation of muds to meet specific subsurface problems. These will al be discussed in subsequent issues.

Shafer Joins Wank & Wank

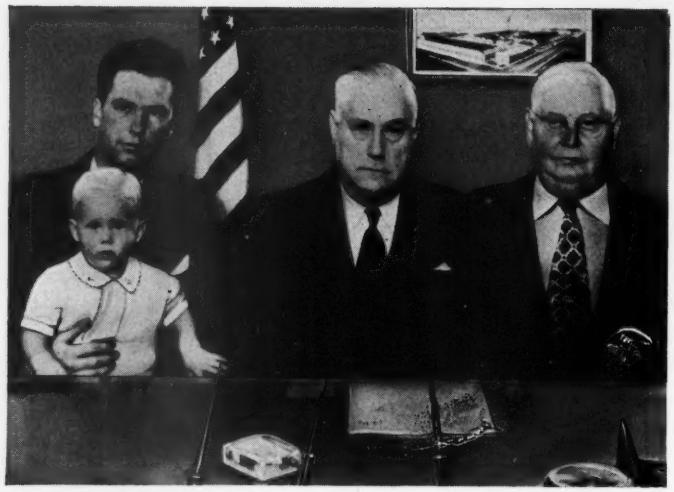
Eugene W. Shafer has joined the San Francisco staff of the 20-year-old advertising firm of Wank and Wank to direct industrial advertising and marketing for the organization. Shafer is well known as an authority on publicizing California-made heavy industrial products and was founder of the San Francisco office of McCarty Company, which he managed for over 10 years. Following an engineering education he entered the advertising field in 1929 from the sales division of Pomona Pump Company.

Cudlipp Elected Vice President of American Trucking Assn.

A. E. Cudlipp, Vice President, Lufkin Foundry & Machine Company and President, Texas Motor Transportation Association, was elected Vice President of American Trucking Association for Texas at a meeting of T.M.T.A. directors in Fort Worth last week. The annual meeting of the American Trucking Association will be held in Cincinnati January 12-16.

The Texas Motor Transportation Association is the State affiliate of the American Trucking Association and is composed of all types of motor carriers, such as private carriers, common carriers, and certificated carriers, of all kinds.

Mr. Cudlipp is serving his third term as president of the Texas Motor Transportation Association.



Congratulations to Axelson Family

Characteristic of the family legend in American industry, when fathers and sons went on from generation to generation building better than they knew, is the Axelson family of Los Angeles, where today three generations are active in the business and another young Axelson, Stephen Charles, 18 months old, already is a small familiar figure about the nine acre plant site at South Boyle Avenue and Randolph Street.

Recently, four Axelson generations met in the Company's offices and a picture, which will become historic in the annals of the Axelson Manufacturing Company, was taken in the office of the Vice-President Delbert F. Axelson. Delbert's brother, J. C. Axelson, is President of the Axelson Manufacturing Company. The picture honors one of the brothers who founded the California firm fifty-four years ago. This founder is Chas. F. Axelson, who came to California from Topeka, Kansas, in the early 90's and in 1892, with his brother Gustavus, founded their first California venture, Acme Iron Works at Santa Ana. In 1895 the firm moved to Los Angeles.

Today, Chas. F. Axelson, now 81, is still active in the business although he has watched with pride his sons, Jule and Delbert, and his grandson Jack take over business responsibilities that are shared, in various activities of the family, while Charles' brother, Gustavus, the other founder of the firm, also is still on the job in the executive offices as Chairman of the Board.

During the war the firm produced great quantities of oil well pumps, sucker rods and other equipment for the United Nation's oil fields and production of the famed Axelson heavy duty lathes was kept abreast of the great demand for this machine in the battle of production. The firm won four stars on its "E" flag awarded early in the wartime operations in appreciation of the achievements of the Company toward victory.

Kern River Wildcat Tops Gray Vedder

Tide Water Associated Oil Co., Luck No. 154 in sec. 30-28s-28e in the Kern River sector of Kern County is drilling at 4800 ft., after topping gray Vedder at 4600 ft. This is a scheduled deep test.

Kern Front Try Stands Cemented

Richfield Oil Corp., Turner No. 1 in sec. 26-28s-27e in the Kern Front area is standing with casing cemented at 2232 ft., with a test of oil sand topped at 2195 ft. the next move. Total depth is 2440 ft. in claystone.

Kern County OIL NEWS

Kern intends to make its past serve its future. Prosperity in oil has always showed increasing returns when the mistakes of the past have been converted into aggressive improvements for the future. Kern County has a good future because it has a good past.

On the other hand oil operators here and men following the industry should not rest upon their laurels. Outmoded policies are inadequate to a preferred future. If any mistakes occur again oilwigs must be willing to break with the past.

Today in this area, those who profess to know the petroleum industry best are putting forth good efforts to create the kind of an oil climate they desire living in. The past has taught them what not to do.

The "golden oil rule" or "gentlemen's agreement" is a precious yardstick by which Kern will tend to produce and move oil or render services. Accordingly the public will be able to consume oil products or make use of the services in order to maintain its prosperous economy.

Oldsters in Kern's independent oil producers activity are disappearing at an alarming rate. These men who have turned PROBLEMS into OPPORTUNITIES are having their tasks terminate far too soon in an untimely fashion. It shows that the pace is severe . . . perhaps it is a young man's game . . . but always they say, "the good die young." This, however, does not detract from the seriousness of it all . . . but it is the oilman's spirit of acceptance.

For the conscience of representatives associated in a great common endeavor, quite often one voice speaks. But a fortnight ago one voice which spoke frequently was stilled by death.

To Dana Hogan this month . . . came as it must come to all oilmen, the final sound of a voice. Men of his fraternity are angry with 1945, when it has at its beginning and its ending been unkind to outstanding leaders of the petroleum industry. Tom McManus, Dana Hogan, Dick Hood and Billy Schultz.

Death Takes Dana Hogan

Nationally known oil operator, Dana Hogan, pioneer of Mountain View oil field died this month in a southland hospital after a six months' illness. He was president of the San Joaquin Valley Oil Producers, director of I.P.A.A., A.P.I. and the Western Oil and Gas Association. He was also on the P.W.C. and helped turn the West's oil **problems** into **opportunities.** He is mourned by the industry as a whole and Kern County recognizes its loss distinctly.

Up from San Francisco (elevation 0) came word that Harry Phoenix of Oilfields Trucking and Construction was low bidder on Kern's Lebec-Frazier Mt. and Mt. Pinos Highway. Then later came word from the U. S. Public Roads that bid action would be postponed for various reasons to open up again some other time. "Tuff luck for a Tuff Pioneer."

At the birth of the depression Harry Phoenix had pioneered by truck and trailer an outlet for Kern's oil. During the lean years that followed he pioneered new consumer fields now thirsty for Kern oil. Working through temporary franchises they became permanent later to isolated parts in Nevada. Then came war. Construction needs were not new by this time because in some instances Harry had to build his own rights of way. So another contribution was made by Phoenix Construction crews. They built runways and highways wherever they were needed. Said Phoenix one day last month, "I'm ready to give the veterans in Kern a job if they'll let me."

Another pioneer is E. C. (Curley) Emmons, owner of the supply company by the same name . . . in Taft. Senator Emmons, Curley's father was a famous California attorney who belonged to the Kern legal family where were located his principal offices. The senator wanted Curley to be a lawyer and he is one in his own right today. But the attorney lists headed the professional bulge in every telephone directory, so Curley studied oil. He learned the business the hard way from the bottom of the well up. By 1930 he had the first pipe straightener in the country and nobody thought it would work . . . they brought him business just to see if it would. Today Curley does a brisk business in oil well supplies and he has not been worrying about the future . . . he has one. He looks like a senator but is a statesman.

Arch Warne of Richfield Oil is still passing out the cigars on account of Robert Bernard, his new youngster. Said Arch, "Gosh, the cigars should be on you—I'm used

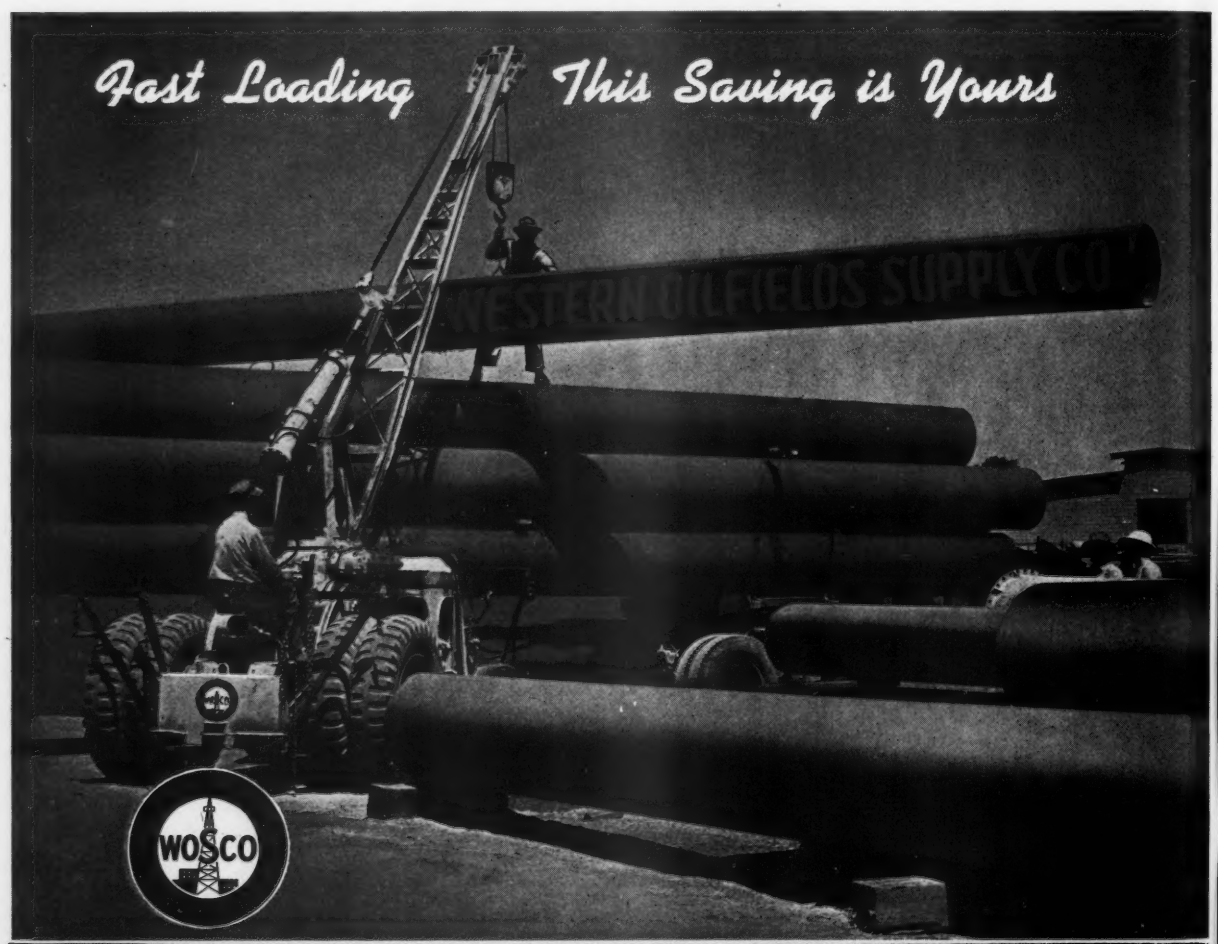
to reverse lend lease." Arch is another fine geologist.

One day this month your newshawk sought the news but spent five hours to see three people. Never during all the war does it seem oilwell supplymen were ever so busy. Jampacked orders are credited to Edison's basement business. Your scribe thinks it's advertising. Be that as it may, may the clang of pipe and growling trucks continue to be noisy and the smell of fresh sawdust permeate the air.

Bob Evans of U.S.E.S., whose human labor resource facility does work for many an oil concern up here, made a report. To National Association of Manufacturers representatives he spoke of many things. Of numbers before the war round figures added up 9000 oilworkers on the job. Then near war's end the number inventoried almost four thousand more. Today demands are just the same and the total employed with returning service men is lessened very slightly with some cutbacks in production. Of ten returning veterans just three belong to Kern.

Major Bill Mathews, Richfield's geophysicist, returned from U. S. European theater and took up former duties here. Drexler Dana, however, has waived his opportunity and started out for himself to do some private consulting work in gypsum, so they say.

Paul Howard at the N.A.M. publicity junket in Kern County was drafted for some consulting that was only gratuitous. To NAMen it paid dividends and Paul gave them an iota of fresh facts. Taking time out from a client at his office where he has been engaged since leaving the assessor's office, Howard said substantially and in part, "Before the war every other day Kern made a million barrels of oil. At war it



WESTERN OILFIELDS SUPPLY CO.

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upped it to 940,000 every day. Now at some cutback time 850,000 comes out of the ground. In '44 2278 holes were punched for oil in California, of which 1095 were Kern's. Taft's Westside, the largest claimant, found new outlets in its various famous hills. Mineral and oil assessments rights are 55 per cent of the total Kern valuation."

"Of all sad words from tongue or pen, the saddest of these are: we bad guessed again." Postwar planners were harping that 20,000 more jobs should be added to Kern's existing 50,000. At first half year's inventory since V-E day we almost needed that many workers. Most needed of all—housing—several thousand workers would be here except for such needs. Agriculture is hardest hit. Farm labor needs ten thousand units the next three years. All others require 5000.

Not yet checked in at the Honolulu geological office is Major Bob Williams, reported to be in San Francisco fresh out of the army and expected back most any day.

On forty hours a week went all Kern majors but two with independents following suit. It is doubtful, according to some, if offices can complete weeks' work by Friday night at present rate of activity in Kern. By month's end all firms will be on forty. Most all are apprehensive of trouble in steel.

Jean L. Philipp of National reports his son confined to U. S. Naval hospital for repairs from a serious injury resulting from a service connected disability. Jean's friends are trusting that reports will be more optimistic than fears for a permanent injury when he is released again.

In company with Jean were Dr. J. M. Kirby and Jim Dulay of Baroid. All three requested name listing on C.O.W.'s subscription rolls. Said Jean, "I'm glad to see 200 names of Kern oilfolks mentioned, as otherwise few would know about some friends of mine who have made good in oil."

Charlie Manley, division manager of Oilfield Construction Company, who helps make Kern Oil News, is modest about industrial insulation.

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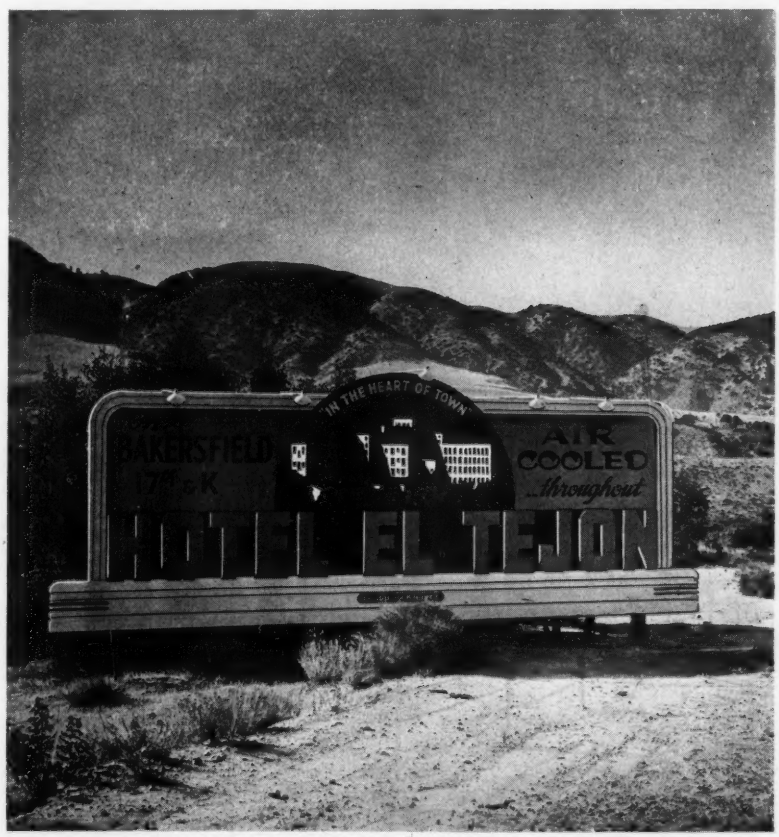

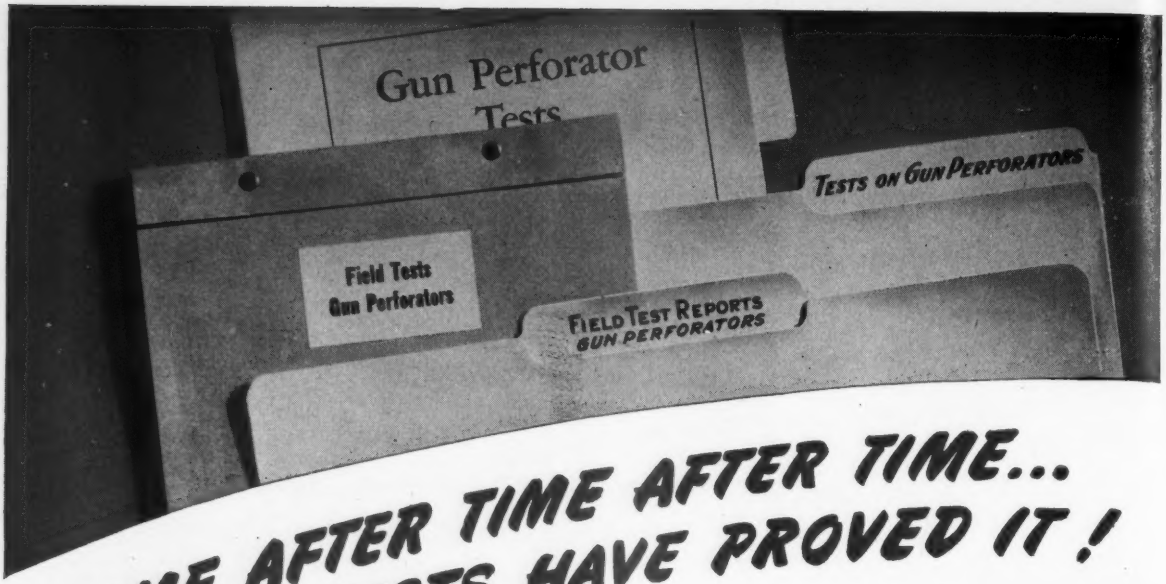

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SACRAMENTO, CALIF.

We have failed five or six times to get people to tell us about any other concern that does a bang up boiler installation business. His hobby is "swing piano", in case you haven't heard. Here is where he does his darnedest.

At the 27th milestone of service with Tide Water Associated Oil Company, J. B. Stevens, petroleum engineer with the San Joaquin Division, was retired. He lives at Stockdale, where now life will be just that more enjoyable with a lot longer time between greens at this beautiful country club area. "JB" graduated from Princeton in 1901 and did some work at U. of C. His daughter Jean is married to Spence Taylor, a petroleum engineer for Pantepec Oil Company of Venezuela.

Oilmen, take notice. California Fish and Game Commission has decided to spend some sizable amount of your tax money on the Kern River Fish Hatchery. This is a welcome piece of news and this department had an idea that it would be well received. There never was a reason why trout should not be grown here in a natural habitat with warmer water and less expensive operation costs per pound of fish. Work began this month and the program is to plant whoppers so that one can really feel them on the hook. The next planting is anticipated to be an oilman's capacity.

HONOLULU'S CHIEF DRAFTSMAN
Gladys Buckley, who took over the rule and compass department at Bakersfield Honolulu geological office. She made designs on the draftboard while able-bodied menfolks went to war with a different design from the draft boards.

Oil for the Airline Highway. Since sectionalism no longer exists over State Highway locations, almost everyone in California is favoring the new proposed Airline Highway, parts of California 33, which will be a main artery between Los Angeles and San Francisco, from a direct and fast route standpoint. Both Chambers of Commerce at these terminals have loaned a listening ear This will not lessen the reputation or the importance of the Golden State Highway U.S. 99 which most people do not recognize as the principal highway of the area west of the Mississippi. As a matter of fact, "99" will be enhanced as a tourists' opportunity and such improvement is decidedly needed if safety is No. 1 priority to primary road construction and improvement. The idea is not a new one. For more than a quarter of a century leading citizens from Maricopa to Hollister have

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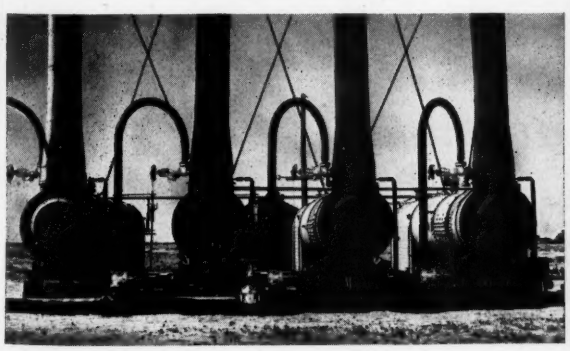

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had an association. Newest head is Assemblyman Jake Leonard of Hollister, while Vern MacLeod of the Taft Chamber of Commerce holds the Secretariat.

Elected president of the American Petroleum Institute, San Joaquin Valley Chapter, was A.B. (Tex) Newby of the Southern California Gas Company in Taft, on November 20 at its annual election meeting. Serving with Newby were elected Kellar Grigsby, vice president and program chairman; T. H. Wallace, second vice and membership chairman. Jack Crooker was elected secretary-treasurer. Tex is also a director of the Kern County Chamber of Commerce and serves as general chairman of legislation and finance for the organization.

Evan Burtner, geologist for Standard Oil at Taft, and John Rogers, Pacific Coast manager of Cooper-Bessemer Corporation of Los Angeles, addressed the chapter at the meeting, according to Tex Newby, and Mr. Burtner spoke on "The 27-B Pool of Buena Vista Hills." "Gas Engines a Versatile Addition to the Internal Combustion Family," was the topic from Mr. Rogers. Paul Lehr from Bakersfield presided over the meeting held at Standard 11-C hall.

Ernest Ellery, the affable exponent of much needed courtesy everywhere else almost except at the El Tejon Hotel, has plans for a new "Oil ZONE." Some lease men are talking about long term contracts and are all oiled up.

"Eternal vigilance" . . . and repetition . . . but this is the price of good methods for making known the nation's resources. Again the report reads . . . "Notices to drill . . . 45 new wells in California, week of December 1 . . . Kern wells 18 . .. total for the California year to this date, 1986 . . . slightly below the 2091 for last year."

Totaling 254 years of service, ten employees of Standard Oil were tendered service recognition pins assigned to: E. Jay Carter, Louie Snyder, George Vestal and Charles Thurston, who had 30 years each. Elmer Jewett and Frank Wirshing had 25, while Tommy Barlow, Joe Steen and Bill Stoneman had 20. Ernie Grimes with 20 years was also honored. At Taft Hotel O. A. Cavins, B. D. Blakely and G. E. Martin were similarly feted in a service pin ceremony.

Saddened recently were Kern oil people to learn of the passing of Harold L. Tilton, 56, who lived here for a quarter of a century and worked for Standard as cashier for many years.

Of 57 Standard men to receive service pins recently were Gene Steele and Glenn Woods.

Fred Owen reported the other day that the Board of Directors of the San Joaquin Valley Oil Producers Association had met to decide on the annual meeting calendar. It has been set for January instead of December. The group at that time was headed by Dana Hogan, since passed away. Allen A. Jergins is vice president, with Owen as second vice and Charles Premo secretary. W. M. Keck, Jr., C. C. Spicer, W. C. Whaley, Harold R. Pauley, Richard Fenton and Charles P. Prewett constitute the remaining directors of the board.

Demand for a quarter million new vehicles next year will make California the best market, we are told from unimpeachable sources in the State Department of Motor Vehicles. Migration of two millions of people to the state during war is the determining factor, and not a great many are leaving. In October a hundred per cent more over the previous years' figures on car entries in the state was recorded. Persons arriving in out-of-state cars totaled for the first ten months 1,168,082. Year before the war in Kern County more than that many cars went through Bakersfield.

Kern got $370,707 from the state motor fund, according to the California Taxpayers Association in a recent report. The apportionment for this county from gas tax was $287,292, of which $26,577 was held for the old unemployment relief loan owed by the county. Other funds received totaled $83,005 from registration and weight fees. Cities (Bakersfield, Taft, Shaffer, Tehachapi, Delano and Maricopa) Incorporated, received for street purposes and state highway work in the communities the amount of $26,987.

Earl Wellington Peck, 75, early Southern California oil developer,

Johnston Stainless Welding Rods

PROVEN QUALITY SINCE 1931

•

A. P. JOHNSTON

1845 E. 57th St. - Los Angeles 11, Calif.

died Thanksgiving Day near Inglewood. He was born in Visalia and was vice president of the Wellington Oil Company, which had operations in the McKittrick-Taft districts, before moving to Signal Hill at Long Beach.

Jay B. Wharton, formerly field manager for Belridge Oil, is now with Western Gulf in Bakersfield as field superintendent. At Belridge he was known as an expert petroleum geologist and engineer, and is as well known in the county of Kern for almost a quarter of a century.

Fresno has a new district office for Standard Oil which will increase the staff and operations of the Bakersfield facility or district office. The new district extends from Stockton and Modesto and to Coalinga and Tulare. J. S. Gordon, superintendent, announced that Sacramento and Bakersfield made up the formation of the new district and that the office here will have charge of the operational and physical problems. No manager has been named yet for the Fresno office. Additional facilities will have to be created here for personnel and office management, it was reported.

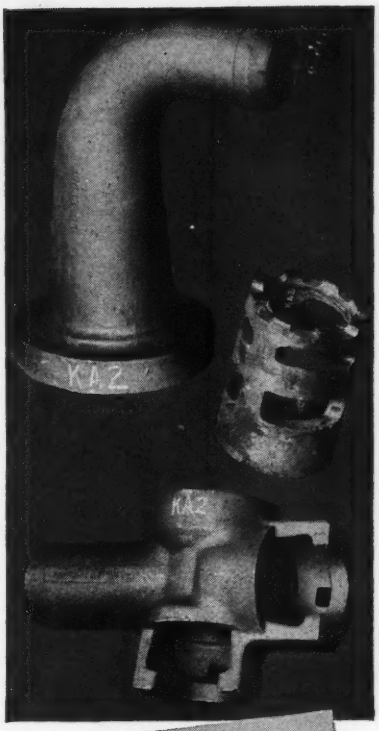
Oil Expert F. C. Hodges from Los Angeles has been appointed as petroleum engineer in the office of County Assessor J. H. Hanks. Hodges succeeds Paul J. Howard, recently resigned, to enter private consultation work. Hodges was formerly with the division of oil and gas of the state department of natural resources, according to "Josh" Hanks, Kern County's Assessor. Hodges resigned as gas engineer for the department. Kern oilmen seem pleased over the appointment and feel that Kern will not lessen its technical and scientific appraisals of oil and mineral lands, by such an able appointment. The new expert has been making studies with USC's Professor, John F. Dodge, in readying estimates of the gas reserves in preparation to revising the 1942 estimates. Hodges is also a graduate from the University of Washington. At Santa Rita, New Mexico, he was identified with the Nevada Consolidated Copper Company as mining engineer. He has a wife, Marie, and two children, George and Fred. The latter is an cadet at Roswell military academy.

Oilmen are a thoughtful frugal clan. One day last lambing season a ewe had orphaned her offspring on the fringe of the closely cropped desert meadow that separated the lane of many pumping wells. Not destined to be deserted by its mother and the shepherd in charge, the scrawney bleats beset the thoughts of an oilman that passed it by. The new shepherd nursed it to recovery and presented it to Mac Shreve, a seven year old junior farmer, who made history for Kern last month. For at Great Western Livestock Show in Los Angeles this lamb won grand championship of the open class division of fat stock. Next day it sold for $5.50 a pound to Cornelius Packing Company. Paul Cornelius said, "It weighed a hundred and fifteen pounds." Not unlike many another true story, this yarn is typical of the forethought, courage and ingenuity of oilmen who are successful because they don't don't know any better. Most believe that many an opportunity should be made the most and best of by decent application in a spirit of patience and industry of hard work.

Reed O'Neil Passes Away

The many friends of Reed O'Neil of the Los Angeles office of Reed Roller Bit Co. regret deeply his passing away on December 12th. Mr. O'Neil has been with the company in California since 1925, having come to California from Houston where he started two years previously as secretary to W. F. Childs. Before that he was with The Texas Company.

While in California he spent a number of years in the Ventura District but was recently export representative for the company in California. He was 44 years of age at the time of his death. He is survived by his widow, Margaret, a daughter Peggy, 18, sons Reed Jr., 16, and Phillip 14, and his mother, Mrs. H. K. Specher, who lives in Houston.



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Top off your good work on your Payroll Savings Plan with an outstanding showing in the Victory Loan—our last all-out effort!

Help bring our boys back to the homes for which they fought—and give our wounded heroes the best of medical care—by backing the Victory Loan! You know your quota! You also know by past war-loan experience that your personal effort and plant solicitation are required to make your quota.

Sell the New F.D. Roosevelt Memorial $200 Bond through your PAYROLL SAVINGS PLAN!

In rallies, interdepartmental contests, and solicitations, promote the new Franklin Delano Roosevelt Memorial $200 Bond! Better than "cash in hand," Victory Bonds enable the buyers to build for the future—assure a needed nest egg for old age.

Keep on giving YOUR MOST to the Victory Loan! All Bond payroll deductions during November and December will be credited to your quota. Every Victory Bond is a "Thank You" to our battle-weary men overseas—also a definite aid in making their dreams of home come true! Get behind the Victory Loan to promote peacetime prosperity for our returning veterans, your nation, your employees--and your own industry!

The Treasury Department acknowledges with appreciation the publication of this message by

CALIFORNIA OIL WORLD

VICTORY LOAN

This is an official U. S. Treasury advertisement prepared under auspices of Treasury Department and War Advertising Council

THIS LAUGH OFF!!

John had taken his girl friend to lunch and she had spoken to a nice-looking man at the next table.

"Is that man a friend of yours?" asked John.

"Yes," she replied.

"Then I think I'll ask him to join us."

"Oh, John, this is so sudden."

"What's so sudden?"

"Why—why—he's our minister."

Joe: "And I'll never leave you for a minute after we're married."

Flo: "Why, you suspicious thing, you."

To the ladies: "If at first you don't succeed, cry, cry, again."

"Why do you close your eyes everytime you take a drink?"

"My doctor said I must not look at liquor."

Many a hiccough is a message from departed spirits.

"Nurse," said the patient, "I'm in love with you. I don't want to get well."

"Don't worry; you won't," she said cheerfully. "The doctor is in love with me, too, and he saw you kiss me this morning."

In the early days of the railroads, a small road was famous for having a notoriously rough stretch of track. One day a new brakeman, making his first run, was standing in the center of the car, grimly clutching the seats to keep from being knocked over.

Suddenly the train struck a smooth piece of track and glided along with the greatest of ease, scarcely making a sound.

Seizing the lantern, the wildeyed brakeman ran for the exit. "Jump for your lives!" he shouted. "She's off the track!"

A stenographer defines a wolf as a modern dry cleaner. He works fast and leaves no ring.

Grandma (looking at granddaughter's bathing suit): "If I could have had clothes like that when I was a girl, you'd be six years older today."

"I never knew till I got a car," said Bishop Eightly, "that profanity was so prevalent."

"Do you hear so much of it on the road?"

"Why," said the Bishop, "nearly everybody I bump into swears most dreadfully."

"Well, there's one thing to be said in radio's favor," began Morton.

"Really! What is it?"

"If you live in an apartment house you can tell what kind of neighbors you have by their sets."

"How come?"

"Easy. If they go for jazz, they are a peppy outfit; if they're fond of symphonies they're dead from the neck up; if they listen to political speeches they're nutty. But if they seldom turn the danged thing on, they're swell folks."

An old gentleman, some 75 years old, made this observation in a local grocery the other day: "I used to come here, bringing my money in my pocketbook and carrying my groceries away in a basket."

"Now," he continued, "the process is reversed: I bring my money in a basket and carry my groceries in my pocketbook."

Things are improving — people are taking their bills out of the envelopes.

Bog—"I got a real kick out of kissing Jane, last night."

Gog—"Any more than usual?"

Bog—"Yea, the old man caught me."

"Young man, I understand that you have made advances to my daughter."

"Yes, sir, I wasn't going to say anything about it, but now that you have, I wish you could get her to pay me back."

How JENSEN Improves a Well

We build the JENSEN Unit to minimize shutdown time and to function economically. How to pump wells more profitably has been our sole concern for more than 25 years.

JENSEN improves a well by making it more dependable over long periods of time. If profitable production is vitally important to you, find out about the JENSEN Unit. It bears no chrome-plated gadgets, but it has time-tried features worth their weight in gold to you.

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California Oil World's Monthly Summary

DEVELOPMENT—PRODUCTION—SUPPLY & DEMAND
PACIFIC COAST TERRITORY
TABLE I—CALIFORNIA DEVELOPMENT—PRODUCTION

	OCTOBER, 1945 DEVELOPMENT				PRODUCTION	
	Active Drilling Wells	Oil Wells Completed	Initial Production B/D	Oil Wells Completed First 10 Months	Daily Average October 1945	Daily Average October 1944
SAN JOAQUIN VALLEY						
Ant Hill	1	3	409	13	772	123
Antelope Hills	.....	.....	.....	4	1,699	2,298
Antelope Plains	.....	.....	.....	.....	.....	29
Arvin	.....	.....	.....	.....	42	36
Bellevue	.....	.....	.....	.....	445	767
Belridge—North	.....	3	110	7	5,771	7,126
Belridge—South	1	9	341	109	12,389	12,196
Blackwell's Corner	.....	.....	.....	6	108	303
Brundage	.....	.....	.....	.....	.....	.....
Buena Vista Hills	1	6	847	136	40,559	24,826
Burrel	.....	.....	.....	.....	14	17
Canal	.....	.....	.....	.....	2,980	3,738
Canfield-Gosford	.....	.....	.....	1	163	169
Canfield Ranch	.....	.....	.....	.....	32	34
Coalinga—East	5	9	1,289	48	18,350	23,062
Coalinga—Nose	.....	.....	.....	2	53,726	62,758
Coalinga—West	1	.....	.....	17	7,611	7,592
Coles Levee—North	.....	1	652	8	20,194	
Coles Levee—South	1	.....	.....	7	2,287	18,194
Dyer Creek	.....	.....	.....	.....	.....	.....
Edison	10	5	6,606	33	8,481	2,837
Elk Hills	8	5	462	210	14,588	28,403
Fruitvale	1	.....	.....	8	8,203	8,556
Greeley	3	1	383	9	11,049	14,316
Helm	4	4	825	18	3,405	1,992
Jacalitos	2	2	171	25	3,625	923
Kern Front	3	2	190	34	12,568	14,052
Kern River	1	1	42	25	9,358	9,604
Kettleman North Dome	6	3	660	17	37,710	40,914
Lanare	3	1	33	8	944	223
Lost Hills	3	.....	.....	6	3,161	3,514
McClung	.....	.....	.....	.....	39	111
McKittrick	4	3	1,293	24	5,887	5,275
Midway-Sunset	1	.....	.....	45	38,090	41,500
Mountain View	1	.....	.....	2	2,594	3,235
Mount Poso	2	1	19	21	17,577	21,461
Paloma	6	3	2,248	15	3,333	5,658
Pleasant Valley	1	.....	.....	4	3,658	4,328
Pyramid Hills	1	.....	.....	8	370	284
Race Track	1	1	24	9	961	53
Raisin City	1	.....	.....	6	2,881	3,107
Rio Bravo	.....	.....	.....	.....	13,189	16,287
Riverdale	.....	.....	.....	7	3,758	5,436
Rosedale Ranch	1	2	45	3	126	.....
Round Mountain	1	5	405	27	9,266	10,349
Santiago	3	1	750	3	818	.....
Sheep Springs	1	.....	.....	3	571	329
Strand—East	.....	.....	.....	1	596	607
Strand—West	.....	.....	.....	.....	1,635	1,743
Tejon	1	.....	.....	10	468	149
Ten Section	.....	.....	.....	.....	8,444	12,434
Union Avenue	1	.....	.....	.....	86	82
Wasco	.....	.....	.....	.....	1,136	2,254
Wheeler Ridge	.....	.....	.....	.....	234	248
Miscellaneous	2	.....	.....	.....	46	.....
TOTAL SAN JOAQUIN VALLEY	82	71	17,804	939	395,997	423,532
COASTAL AREA						
Aliso Canyon	2	.....	.....	6	2,919	3,362
Bradley Canyon	.....	.....	.....	.....	.....	9
Capitan	2	2	1,046	6	75	2,624
Del Valle	.....	1	877	3	1,889	1,942
Elwood	1	1	123	5	6,183	5,709
Gato Ridge	.....	.....	.....	6	4,158	5,002
Hasley Canyon	.....	.....	.....	.....	.....	.....
Newhall-Potrero	.....	.....	.....	5	5,563	5,148
Oak Canyon	1	1	215	5	1,901	1,290
Oxnard	.....	1	100	2	1,316	913

	OCTOBER, 1945 DEVELOPMENT				PRODUCTION	
MONTHLY SUMMARY—Continued	Active Drilling Wells	Oil Wells Completed	Initial Production B/D	Oil Wells Completed First 10 Months	Daily Average October 1945	Daily Average October 1944
Padre Canyon	.....	1	803	4	2,207	1,565
Ramona	2	.....	.....	5	256	.....
Rincon	2	2	246	13	4,407	4,454
San Martinez	1	1	635	7	3,468	2,549
San Miguelito	2	.....	.....	4	4,729	5,765
Santa Barbara	.....	.....	.....	.....	105	87
Santa Maria	3	1	29	9	12,244	14,221
Santa Maria Valley	8	3	700	68	33,936	32,905
Summerland	.....	.....	.....	.....	.....	7
Ventura Avenue	9	5	5,598	42	43,814	49,855
Ventura-Newhall	7	1	180	37	6,188	5,822
Watsonville	.....	.....	.....	.....	25	25
Zaca Creek**	.....	.....	.....	.....	239	.....
TOTAL COASTAL BASIN	40	20	10,552	227	135,622	143,344
LOS ANGELES BASIN						
Brea-Olinda	.....	.....	.....	1	10,793	12,037
Buena Park	.....	.....	.....	.....	84	155
Coyote—East	1	.....	.....	5	4,845	5,231
Coyote—West	3	1	146	19	15,806	12,010
Dominguez	1	1	123	8	15,864	20,766
El Segundo	.....	.....	.....	.....	744	958
Huntington Beach	6	1	161	43	45,915	47,852
Inglewood	.....	.....	.....	1	14,806	17,201
Lawndale	.....	.....	.....	.....	16	28
Long Beach	3	.....	.....	1	25,054	28,875
Los Angeles-Salt Lake	.....	.....	.....	.....	513	454
Montebello	1	1	115	7	9,657	10,479
Newport-Costa Mesa	8	8	715	41	2,232	.....
Playa Del Rey	1	.....	.....	.....	2,226	2,556
Potrero	.....	.....	.....	1	1,097	1,079
Richfield	3	2	253	11	7,163	7,034
Rosecrans	.....	.....	.....	6	5,088	6,055
Sansinena	1	.....	.....	2	122	.....
Santa Fe Springs	.....	.....	.....	1	15,278	18,471
Seal Beach	2	3	2,724	15	9,614	8,385
Torrance	2	4	253	41	9,088	8,604
Turnbull Canyon	.....	.....	.....	.....	156	221
Whittier	.....	.....	.....	3	976	1,073
Wilmington	16	13	1,792	116	98,764	103,239
Yorba Linda	.....	.....	.....	.....	.....	712
TOTAL LOS ANGELES BASIN	48	34	6,282	322	295,901	313,475
EXPLORATORY						
Outpost Wells	28	.....	.....	.....	.....	.....
Wildcats	26	.....	.....	.....	.....	.....
Gas Wells	5	5	.....	48	.....	.....
TOTAL CALIFORNIA	229	129	34,638	1,874*	827,520	880,351

*—Includes gas wells completed and 338 wells abandoned.
**—Formerly included with Santa Maria.

TABLE II—SUPPLY AND DEMAND FOR PETROLEUM PRODUCTS
PACIFIC COAST TERRITORY
DATA FOR OCTOBER OF EACH YEAR

	October 1940	October 1941	October 1942	October 1943	October 1944	October 1945
RAW MATERIAL B/D						
1. Crude Oil Produced—California	610,903	651,194	723,313	786,387	880,351	827,520
2. Crude Oil from outside 5 Western States	1,870	1,903	3,945	5,162	4,262	3,222
3. Natural Gasoline Produced	40,000	38,000	36,000	39,000	41,000	40,000
SUPPLY OF FINISHED PRODUCTS						
ALL SOURCES—B/D						
4. Natural Gas., L.P.G. and Condensate	3,774	3,516	2,484	7,710	16,808	14,839
5. Gasoline and Naphtha Distillates	221,452	260,097	263,903	272,355	319,903	296,129
6. Kerosene and Kerosene Distillates	10,322	(2,032)	6,903	9,742	7,677	9,516
7. Lubricating Oils, etc	10,839	13,807	11,194	14,452	13,710	12,290
8. Gas Oil and Diesel Oil	69,839	68,516	76,129	81,612	87,839	66,903
9. Fuel Oil Residuum	246,645	300,226	366,387	393,387	446,710	416,742
10. Asphalt and Road Oils	22,032	35,161	41,097	31,516	29,194	24,807
11. Coke and Other Finished Products	1,452	4,032	1,387	1,677	3,903	613
12. Other Unfinished Oils	(484)	(6,613)	(226)	(4,935)	(419)	(387)
13. Refinery Shortage and Gas	19,387	24,032	30,257	39,614	44,163	36,870
14. Crude Oil (Net)	54,613	(129)	(24,677)	11,549	(10,774)	17,774
15. TOTAL SUPPLY	**659,871**	**700,613**	**774,838**	**858,679**	**958,714**	**896,096**
16. TOTAL DEMAND	707,935	704,033	811,257	987,420	944,777	897,160
17. DIFFERENCE	(48,064)	(3,420)	(36,419)	(128,741)	13,937	(1,064)
18. Stocks on hand End of each month (Total Bbls.)	153,013,000	142,164,000	130,504,000	110,677,000	93,555,000	76,503,000

of the American Petroleum Institute's Central Committee on Drilling and Production Practice for 1946. Lot Bowen, Western Gulf Oil Company has been named national chairman of the Topical Committee on Drilling Practice; and Norris Johnston, General Petroleum Corp. has been named national chairman of the Topical Committee Production Technology.

Five California oil men are among those comprising the membership of the Executive Committee of the Central Committee on Drilling & Production Practice. J. E. Sherborne is vice-chairman, with T. H. Acres, Richfield Oil Co., E. C. Babson, Union Oil Co., Norris Johnston, General Petroleum Corp., and R. W. Marshall, Drilling & Exploration Co., members.

J. E. Sherborne is also national chairman of the 1946 Program Committee of the Division of Production. Lot Bowen and Norris Johnston are also serving on the program committee along with representatives from other parts of the U. S.

December Meeting Southern California Section A.I.M.E.

The Southern California Section of the American Institute of Mining and Metallurgical Engineers held its final meeting of the year at the University Club in Los Angeles on Friday, December 14.

Dr. William Fowler, Associate Professor of Physics at the California Institute of Technology, addressed the group on "Nuclear Fission and Atomic Energy." He gave a brief summary of the growth of knowledge of nuclear physics and the development of the atomic bombs as used in the war against Japan. For security reasons he confined his discussion to material already released by governmental authorities. Dr. Fowler was active in the development of the atomic bombs and is conversant with the whole field of atomic energy and consequently gave an enlightening talk which was followed by questions from the floor.

Mr. Harvey Mudd, National President of the A.I.M.E., discussed mining conditions in the United States. He indicated that the mining and petroleum industries seemed generally optomistic about prospects for the post-war years. Mr. Mudd has traveled to all the mining centers in the United States in the last year as National President of the A.I.M.E.

Dr. John Herman, Vote Tallier, announced the results of the election of officers for 1946 for the Southern California Section. Mr. E. O. Slater, President of the Smith-Emery Company, was elected Chairman. Mr. Harold J. Clark, Petroleum Engineer with the Conservation Committee of California Oil Producers, was elected Secretary-Treasurer. Mr. Hugh R. Van Wagenen, Mining Consultant, was elected Vice-Chairman for mining, and Mr. T. A. Atkinson was elected Vice Chairman for petroleum. Mr. Atkinson is with the General Petroleum Corporation. Members elected to the executive committee are: Carlton Beal, Petroleum Consultant, L. W. Chasteen, Petroleum Engineer with Union Oil Company, Walker S. Clute, Petroleum Consultant, W. H. Geis, Assistant to the President of Union Oil Company, and S. Paul Lindau, Mining Engineer with Western Precipitation Company. Mr. A. B. Campbell, Chairman for 1945 Southern California Section, automatically becomes a member of the executive committee as well as Mr. John P. DeHetre, Chairman of the Junior Division for 1946.

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Field Development

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Los Angeles Basin

Bandini Wildcat Resumes Coring

The Los Angeles Basin's most interesting drilling job, Richfield Oil Corp., U. P. Unit No. 1 in sec. 9-2s-12w in the Bandini area, is ready to resume coring from present depth of 8608 ft., following a second test, which again showed water cut of approximately 30 per cent.

The flow was rated on test between 800 and 1000 barrels a day, along with 900,000 cubic ft. of gas.

On the initial test some weeks ago, water cut, comparable to that indicated in the second trial, apparently was not solved by cementing jobs.

Consensus is that the well is edgy, and it may be that Richfield's Simons No. 1 in sec. 15, coring at 6875 ft., and Vail No. 1 in sec. 16, rigging up, may be more favorably located on structure and find oil less tinged by water.

C. C. M. O. Co., which also is exploring at Bandini, is coring Bandini No. 1 in sec. 21 below 7400 ft.

Buena Park Try Coring On Down

Two miles northwest of the city of Buena Park, General Petroleum Corp. is drilling ahead and spot coring at 12,300 ft. in Librown No. 1 deep test in sec. 21-3s-11w, Orange County. Operations were recently resumed at 12,205 ft., after the well was swabbed and flowed for some days.

Del Valle Area Adds New Pumper

In the west end of the Del Valle area, Universal Consolidated has completed T. E. Adams-Aguirre No. 1 in sec. 13-4n-18w at a total depth of 3169 ft., pumping between 40 and 45 barrels of 20.6 gravity clean oil a day. The 7-in. casing is cemented at 2987 ft.

Antelope Valley Test Drills On

Del Sur Oil Co., Del Sur No. 1 in sec. 26-7n-13w in the Palmdale area continues to explore ahead below 2500 feet in what may be volcanics. This fact, however, has not been officially confirmed.

Lehr Co., also sponsor of a wildcat test in Antelope Valley, is reported drilling its No. 1 in sec. 33-8n-8w in the Hi Vista area in shallow formations.

Aliso Canyon Try Coring Wet Oil Sand

Approximately one mile east of the present production boundary of the Aliso Canyon field, Wilshire Oil Co., Marquis No. 1 in sec. 35-3n-16w cored soft shale and fine oil sand, which looks wet, in an interval off bottom at 8173 ft. This sand section may not be the Sesnon zone, field men indicated.

If Wilshire eventually succeeds in developing new production at this location, others benefiting will include Universal Consolidated, Tide Water Associated and Union.

Chino Hills Well Running 5-in. Liner

In the Chino Hills area of San Bernardino County, Kraemer-Backs Co. is running 5-in. liner in Kraemer-Backs No. 3 in sec. 33-2s-8w, with hole bottomed at 1590 ft.

Coyote Project Fishing Packer

Barnsdall Oil Co., No. 3, its third well on the Sunny Hills Ranch near West Coyote field, was last reported fishing packer, with plug at 6500 ft. Original bottom is 6982 ft. Location falls in sec. 21-3s-10w.

Turnbull Try Drills Shale

A. W. Lyddon, Operator, William Rowland Estate No. 3-1 in sec. 17-2s-10w in the Turnbull area above Whittier is making hole ahead in hard shale at 3675 ft., without reported showings of oil or gas.

New Well At Newport Beach

In the shallow West Newport Beach field, Barnhart-Morrow Consolidated has completed Deeble No. 5 at a total depth of 2278 ft. for a yield of 75 barrels of 18 gravity oil a day. Meyer No. 2 is bottomed at 2315 ft. and about to be given the finishing touches.

L. A. Delaney and C. J. Gibson have spudded Noll No. 1 and are making rapid drilling time in surface formations. A. B. Diffie is abandoning Wierick No. 1 at a total depth of 3002 ft.

Macoil Co. has four drilling jobs progressing ahead at various operational stages. Petropar, Inc., Noll No. 1 is drilling ahead below 1100 feet. This venture found the "A" zone absent.

Athens Well Pumped Wet

California Flyers, Inc., Gordon No. 3 in the Athens-Rosecrans

field pumped wet on test and preparations are being made to run water witch in the well, which went to a total depth of 8755 ft., before plugging back to 8707 ft.

Union Oil Co. has built foundation for Rosecrans No. 47 near the intersection of Rosecrans Ave. and Broadway. Rosecrans No. 50 is bottomed at 6764 ft. and is ready for gun-perforating.

Pico Anticline Try Drills Conglomerate

Seaboard Oil Co. has resumed drilling Evans No. 1-A wildcat in sec. 23-3s-9w on the Pico anticline in the Newhall district, after completing a difficult fishing job. Present depth is 7730 feet in conglomerate.

Beach Depth Well On Swabbing Test

Shell Oil Co., Alamitos No. 48-A in the Long Beach field swabbed for production test and recovered mud and oil with fluid level at 3000 ft., an increase of 1000 ft. in the preceding 24 hours. Perforations are being washed, after which swabbing will be resumed.

Total depth is 14,950 ft., with the shut-off at 12,853 ft. Commercial production at this location would constitute somewhat of a world record for depth.

Richfield Oil Corp., Delaney-Freeman No. 2 at Long Beach, is drilling slightly below 2600 ft.

Oak Canyon Try Indicates Little

Western Gulf Oil Co. is preparing to squeeze W. E. Stevens No. 1 in sec. 4-4n-17w in the Oak Canyon area, after holes shot around 2360 ft. showed nothing but a little gas. Total depth is 9231 ft.

Medearis Drills Wilmington Well

Paul A. Medearis is drilling Salter No. 1 near the corner of Wilmington Blvd. and Chandler St. at a depth of 3425 ft., after cementing casing at 3218 ft.

W. E. Nicolai is understood as having taken over the Wilton Oil Co. No. 1 and No. 8 wells in the field.

Placerita Try Still Inactive

Petroleum Exploration Co., Kraft No. 1 wildcat in sec. 31-4n-15w in the Placerita Creek area of Los Angeles County, is partly rigged but still stands idle.

New Job At Potrero Area

Basin Oil Co. has staked location for Potrero in an area marked by a number of old producers. The well will finish above 4000 ft.

Seal Beach Test Running Electrolog

Marine Exploration Co., State No. 1 sec. 11-5s-12w in the Seal Beach area, Los Angeles County, is running electric log, following a redrill of the well to 4000 ft. Original depth is 7025 ft.

After electric survey, protection string probably will be landed and set.

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San Joaquin Valley

British-American Extends Grapevine

Widening the Grapevine area about a half mile to the southeast, British-American Oil Producing Co., Tejon Ranch No. 41-5 in sec. 5-10n-19w pumped at the rate of 300 barrels of 20 gravity oil a day on test.

A permanent pump foundation and a battery of tanks are under construction for the new producer, which will be followed by another drilling job, located some 660 ft. east of the No. 41-5, bottomed at 2660 ft. in oil sand.

Shandon Scheduled For Shallow Play

An important shallow exploration play is planned by H. E. Dawson of Los Angeles on some 5500 acres near the town of Shandon in township 26 south and range 15 east in San Luis Obispo County. The drilling will be contracted.

New Jasmine Test Commences Drilling

A newcomer to the production branch of the California petroleum industry, Fred Goodstein of Casper, Wyoming, is drilling Hart No. 1 in sec. 25-25s-26e in the Jasmine area of Kern County not a great distance below grass roots, after spudding-in a few days previously.

Field operations are being handled by Independent Exploration Co. of Bakersfield, which in recent weeks has chalked up a number of outstanding field successes. Ralph M. Parsons Co. is the drilling contractor on the Goodstein job.

In the meantime, Beverly Trading and Exploration Co. has abandoned Orange Land Co. No. 1 in sec. 35-25s-27e, after going to a bottom of 2279 ft. in gray sand. The Olcese was stopped at 1394, Pyramid Hills at 2175 and Vedder at 2267 ft.

Edison Well Pumping Oil

California Exploration Co., which is rigging Cauley No. 1 in sec. 16-30s-29e, has added a new producer to the Edison area by finishing Porter No. 1 in sec. 17 on the pump for 120 barrels of oil a day from a total depth of 3950 ft. Initial cut was 15 per cent.

Union Oil Co., Brockman No. 2-A in sec. 13-30s-29e is drilling in schist below 2850 ft. Dougherty No. 3 in sec. 14 is being prepared for deepening from present bottom at 2600 ft.

In sec. 11-30s-29e, General Petroleum's Speed No. 38-11 is pumping salt water at a daily rate of 758 barrels. North American Oil Consolidated is rigging up Brown No. 7 in sec. 14-30s-29e in order to make necessary repairs. Total depth is 2965 ft.

Cymric Try In Shale Body

The Dumm Bros.-Olympic Refining combination No. 17 in sec. 22-29s-21e in the Cymric area is drilling shale at 5450 ft., and evidently running low on structure. The Phacoides oil sand was topped at 4947 ft.

After swabbed and flowing by heads, Union Oil Co., Anderson No. 54-26 in sec. 26-29s-21e is having perforations washed. Plugged depth is 3615 ft.

Pyramid Hills Test Coring Oil Measure

Not far from a group of shallow producers owned by California Standard, F. S. & D. Oil Co. is coring oil sand at 1200 ft. in Core Hole No. 4 in sec. 8-24s-18e in the Pyramid Hills, Kings County. No. 1 stands idle at a plugged depth of 831 ft. No. 3 is idle at 333 ft.

Buena Vista Try Getting Deeper

On the plunge of the Buena Vista Hills anticline, Seaboard Oil Co. is prospecting ahead below 6900 ft. in Swum-BVA No. 73-14 in sec. 14-32s-25e, Kern County. Backers of the test also include Universal Consolidated, Wilshire and Mohawk.

Devils Den Jobs Inactive

L. B. Priest & DeKalb, Blake No. 12 in sec. 25-25s-18e in the Devils Den area is idle at 815 ft. William G. McAllister, McCalden et al No. 1 in sec. 26-25s-18e also is idle at 1327 ft.

San Emidio Well Drills Brown Shale

At San Emidio, Kern County, Western Gulf Oil Co. is making headway in hard brown shale at 6300 ft. in Los Lobos No. 1 in sec. 4-10n-22w, Kern County. San Emidio No. 2 in sec. 35-11n-20w is a rig.

Quality Oil At Santiago

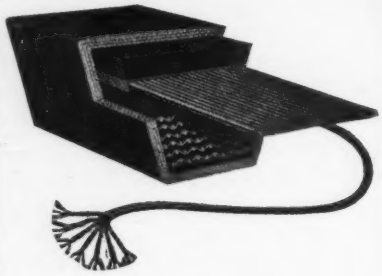
A mile northwest of the discovery well, Quality Oil Co. has staked location for its "L" well in sec. 20-11n-23w in the Santiago area near the old Sunset field. Richfield Oil's Leutholz No. A-3 in sec. 22-11n-23w is idle after redrilling to 3011 ft. Texas Co., Western Minerals Fee No. 2 in sec. 23 is likewise idle at 4633 ft.

Mt. View Well Prepares Test

Having drilled and cored to a bottom of 5441 ft. in Derby No. 34 in sec. 33-30s-29e in wildcat territory adjacent to the Mountain View field, J. Paul Getty now is making ready to inaugurate trial of oil sand encountered in the interval of 5315-5325 ft. J. A. C. No. 8-8 in sec. 8 is inactive at 6560 ft.

Sheep Springs Adds Pump Well

After plugging back from 4541 ft. to 2864 ft., Independent Exploration Co. has finished Cymric No. 1 in sec. 21-29s-21e on the pump for a yield of 53 barrels of 16.5 gravity crude daily, cutting 3 per cent. Temblor No. 1 in sec. 17 is coring brown shale at 1950 ft. Faulting was indicated around 1650 ft.



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Middle Dome Test Coring in Sandstone

On the Middle Dome of Kettleman Hills, Standard Oil Co. was last reported coring in oil spotted sandstone at a depth of 9256 ft. Four or five attempts to conduct formation test of a zone found between 9150 and 9200 ft. were of no avail due to packer failure on each occasion.

This is one of the most closely watched tests in California, due to its proximity to the old Burbank wildcat, which gave every sign of a substantial producer of oil and gas, until casing leaks and other mechanical difficulties brought about abandonment. It was worked over for years before finally being given up.

Amerada Drilling Castro Explorer

Amerada Petroleum Corp. is drilling Castro No. 45-12 wildcat test in sec. 12-30s-27e, two miles south of Bakersfield, below 700 ft. The surmised objective is an oil accumulation between 6000 and 7000 ft.

Helm Well Flowing Oil

The Pacific Western-George F. Getty combination has finished Dodini No. 1 in sec. 14-17s-18e in the Lanare field of Fresno County, flowing 200 barrels of oil and 500,000 cubic ft. of gas a day from an interval open to production between 6829 and 6842 ft. Total depth is 6862 ft.

In the Raisin City district, Petrol Corp., No. 1-22 in sec. 22-15s-19e has reached a depth of 6350 ft. in gray sand and shell and is preparing to run electric log.

Hope Fading For Lost Hills Well

As a result of failing to develop production of commercial worth in the interval of 5925-5995 ft. in Cahn No. 58-4 in sec. 4-27s-21e in the Lost Hills field, Standard Oil Co. is expected to give up the well, which encountered all manner of difficulties in exploring to 11,080 ft.

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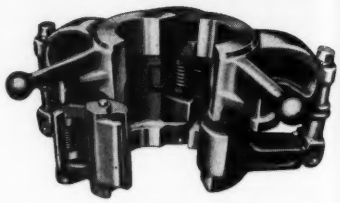

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Coastal and Northern District

Torrey Canyon Well Abandoned

Oceanic Oil Co., which recently chalked up an important discovery in conjunction with Independent Exploration Co. in the Cymric area of San Joaquin Valley, has plugged and abandoned No. 1 well on the Hunter Ranch in sec. 32-4n-18w, Ventura County, after going to a total depth of 2760 ft. in gray and wet sand.

Designed to uncover a surmised oil accumulation about three-quarters of a mile north of a number of Union Oil Co. shallow producers, Oceanic has drawn no plans for further exploration in the area.

Tehama County Test Progressing

Northern Oil & Gas Co., Tiger No. 1 in sec. 1-23n-7w in the Paskenta area of Tehama County is making progress below 1100 ft., with the ditch reported showing oil and gas. Natural gas is anticipated between 1500 and 2000 wt. Oil is looked for in the neighborhood of 3500 ft.

George S. Russell, president of the company, was at a time supervisor of service stations for Standard Oil Co. in San Francisco. Bert Brunwin, drilling superintendent, is widely known in Los Angeles oil circles.

Northern Oil & Gas has 800 acres under lease on ground within the confines of the Tait ranch. Lessor is the Morris Estate Co. of San Francisco, which also holds the adjoining 1000 acres.

Shell Active In Gas Country

Shell Oil Co., Inc. has a number of active drilling jobs in gas country in Northern California. Included are Lambie No. 4 in Kirby Hills and McCune No. 1 in the Winters area, Solano County. The former is making hole ahead at 3100 ft. The latter just spudded and is still in the shallow formations.

Staten Island No. 2 in the Isleton area, Sacramento County, is rigging up.

Packer Island Try Prospecting

Near the town of Willow in Glenn County, General Petroleum Corp. is drilling Norman No. 1 in the Packer Island area in sec. 5-18n-1w below 3700 ft., without official intimation of what may have been uncovered of interest to present depth.

Santa Maria Well Comes In

General Petroleum Corporation, which acquired a number of wells drilled by the late J. E. O'Donnell in the southwest sector of the Santa Maria Valley field, has deepened to 4910 ft. and completed Defense No. 1 in sec. 20-10n-34w for an initial of 220 barrels a day of 17.1 gravity oil.

This is the first Santa Maria production developed under the banner of General Petroleum and since completed this inaugural well has been showing an increased rate of production, the last gauge indicating 240 barrels a day. Tognazzini No. 1, a northerly offset, is grading for rig site.

Bolsa Chica Oil Corp., Wheat No. 1 in sec. 22 is idle at 5002 ft. G. H. Cherry Oil Co., Rembush No. 4 in sec. 35 is being rigged to pump from 5633 ft.

Bel-Air Oil Co. has abandoned Donovan No. 2 in sec. 13, following swabbing operations which recovered only salt water. Location for Bradley No. 2 has been made in sec. 19-10n-33w, Morris No. 2 in sec. 27-10n-34w, and Tonascia No. 7 in sec. 22-10n-34w.

Arthur Macrate & Son of Long Beach has finished Rice No. 4 in sec. 23-10n-34w on the pump for an estimated 50 barrels a day from 2626 ft.

Carpinteria Test Redrilling at 2800 Ft.

Near the beach at Carpinteria, Western Gulf Oil Co. is drilling No. 1 wildcat in sec. 30-4n-25w below 2800 ft. Original depth is 3619 ft. The property undergoing test is owned by Peter Cooper Bryce, New York and Santa Barbara businessman.

New Ojai Test Starts

Trans-Cal Gas & Oil Corp. has excavated cellar for Byhara No. 2 in sec. 12-4n-22w, Oaji area of Ventura County. No. 3 and No. 5 are locations on the section.

The production effort of Triangle Oil Co., Ojai No. 1, in sec. 12 is idle at 1315 ft.

Shiells Canyon Try Rigging To Deepen

John Schumacher, Calumet No. 1 in sec. 3-3n-19w in the Shiells Canyon area is being rigged to deepen from present depth of 2762 ft. Casing is cemented at 1887 ft.

Texas Co., Shiells No. 157 in sec. 4-3n-10w is a completion. It pumped initially 88 barrels of 30.7 gravity oil a day. Total depth is 2744 ft.

Capitan Field Adds Producers

Shell Oil Co. has brought to successful conclusion two wells in the Capitan field of Santa Barbara County, good for a combined output of 450 barrels of oil daily. The new wells are Covarrubias No. 1-43 and No. 1-44 in sec. 32-5n-30w, finished at 3515 and 3500 ft., respectively.

No. 1-45 has just commenced making hole.

Los Alamos Test Continues Drilling

General Petroleum Corp., Los Alamos No. 3 in sec. 31-8n-33w in the Lompoc district is drilling at 4970 ft. in fractured shale. On a retest of the interval of 4367-4563 ft., recovery was gassy, oily mud. Formation test of the interval of 4787-4965 ft., showed mud and a slight blow.

Arroyo Grande Well Completed

On property acquired some months ago from the Dollie Adams Oil Co., Southern California Petroleum Corp. has finished its first well. It is Dollie No. 1 in sec. 6-32s-13e, which pumped 40 barrels of 14.7 gravity clean oil from 1135

ft. The well is in the Arroyo Grande field, San Luis Obispo County.

Cat Canyon Well Yields

Routine development of Union Oil Co. properties in the Cat Canyon field has accounted for completion of another substantial producing well. It is Bell No. 27 in sec. 36-9n-33w, which established a yield of 498 barrels of 16.4 gravity oil a day from 5386 ft.

Bell No. 24 in sec. 35 is a foundation, Bell No. 29 is drilling at 4500 ft., and Bell No. 31 and No. 47 are engaged in preliminary work.

Palos Verdes Estates, Inc., P. C. No. 2 in sec. 27-9n-32w is down in brown shale below 5700 ft.

Modelo Project Shows Oil Trace

Pacific Western Oil Corp., Crocker Fee No. 1-D in sec. 7-4n-18w in the Modelo field, Ventura County, bailed dry on test of holes shot from 1120 to 1200 ft. After standing one hour, fluid rose 17 ft. with a trace of oil. The try explored to 10,504 ft., before plugging way back to 1230 ft.

So. Mountain Interest Center

The Oil Tool Corp., S. M. No. 7 in sec. 19-3n-21w in the South Mountain field is drilling at 4630 ft. Hi Up Oil Co., S. M. No. 1 has reached 4625 ft. M. & M. Associates, Yale Richardson No. 1 in sec. 13 is making hole ahead at 1330 ft. Texas Co., S. O. No. 22 in sec. 18-3n-20w is yet a rig only.

Los Nietos Co. & Lucy Smith Battson, C. & H. No. 1 in sec. 22-3n-21w remains idle at a redrilled depth of 5130 ft. Total depth is 6315 ft.

Two Drilling Near Santa Paula

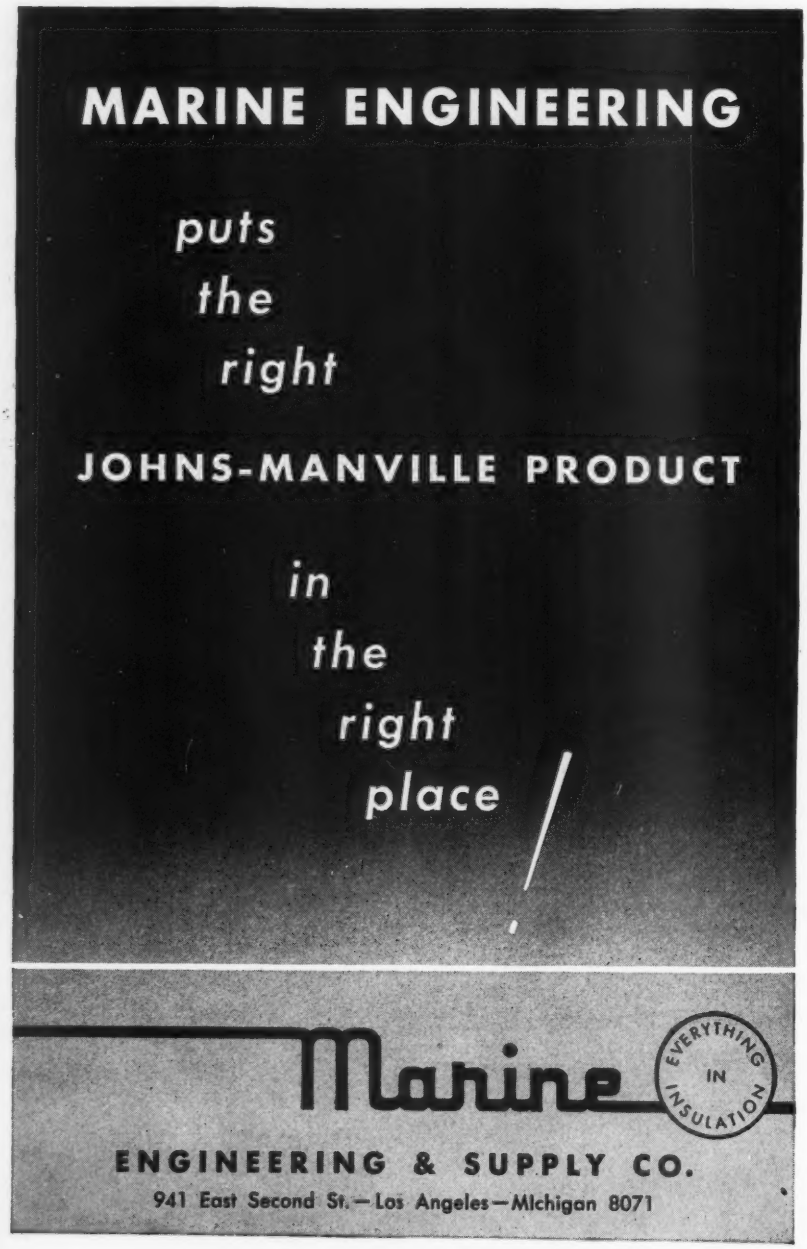
Near the town of Santa Paula, Standard Oil Co. is drilling Toland Comm. No. 1 in sec. 18-4n-20w in the Timber Canyon field at 5757 ft., with operations punctuated now and again by a spot core.

Santa Paula Unit No. 1 in sec. 10-4n-20w has been carried to 9480 ft., without reported showings of oil or gas.

Houdry to Erect Small Cat Unit

Contracts have been executed between the Houdry Process Corporation, Wilmington, Delaware, and Leonard Refineries, Inc., Alma, Michigan, whereby Leonard will acquire a Thermofor Catalytic Cracking unit. It is the first small scale unit to be built with private capital to operate for post-war motor gasoline production.

The small integral TCC unit has been designed by Houdry engineers to process 3,000 B/D of charge stock. While the unit embodies a number of design simplifications, it is, nevertheless, in principal very similar to the larger TCC units built for the war program. The simplifications include integral elevator design for both spent and regenerated catalyst. Increased catalyst rates make possible the elimination of vapor superheaters. The structure has been substantially simplified and the overall height has been reduced.



Insulation—A Factor In Efficient Refinery Operation

(Continued from Page 11)

high temperatures is apparent. Furthermore, the cold processing of oils demands that temperatures be maintained within a narrow range and such control cannot be attained without the use of adequate insulation. Modern processes demand greater attention to types of insulating materials for low temperature operations and their adaptability to conditions encountered. The requirements can be summed up briefly as follows:

1—The insulation must possess low conductivity (high resistance to the flow of heat) at low temperatures and must have the ability to retain this low conductivity in service.

2—It must not absorb moisture because low temperatures involve condensation.

3—It must permit thorough sealing against infiltration of air because condensation within the material reduces its efficiency.

4—It must have sufficient strength to be handled and applied without breakage; and it must be easily sawed and worked on the job.

5—It must be vermin-proof and not susceptible to bacterial growth.

A widely used material meeting these requirements is a "rock cork" which is made from rock wool combined with a waterproof binding ingredient and moulded into sheets of thickness of from 1 to 4 inches. The necessary thickness of the insulation for the temperature involved is thus easily obtained by the use of one or two layers of the insulating material, which thickness may be 8 inches for temperatures ranging from —15° to —25° F.

When insulating brine coolers, lagging is attached to the shell with hot rock cork asphalt and the asphalt is used for the second layer with wood skewers being driven in at an angle for reinforcement. Each course is further secured with straps. The ends of the coolers are insulated with removable discs of the rock cork. The entire exposed surface of the insulation is waterproofed. In the case of vertical coolers, the bottom is enclosed in a housing of rock cork lags and the interior space of the housing is filled with granulated rock cork.

Insulation of chillers not only conserves refrigeration but also maintains the requisite low brine temperature. Damp-proofing is most important in securing a successful installation. It is also important that sufficient clearance be provided between bare chillers in order to allow the required thickness of insulation on the sides and to provide adequate space for the men to work while applying the insulating materials. In insulating pipe chillers, the rock cork sheets are used on wood framing for the outer shell and granulated rock cork for filling in around the pipe. Waterproofing felt is employed to make the chillers damp-proof. The various kinds of chillers are insulated in ways best suited to meet the peculiarities of design.

When insulating chilling and cold-settling tanks, three layers of rock cork may be necessary since temperatures as low as —60° F. may be involved. The general methods followed for chilling towers are the same as for chilling tanks. On the chilling tower top, rock cork sheets are cut to conform to the curvature and are applied with rock cork asphalt. Second and third layers are similarly applied and additionally secured with wood skewers. A removable cover on a wood frame is provided for the top manhole and filled with granulated material.

The insulation of pipes carrying brine, ammonia and other cold liquids or gases is naturally of great importance. Cork pipe insulation is extensively used for this purpose, the thickness depending on the temperatures involved. This insulation is furnished in semi-cylindrical sections for the pipe and as jackets to fit all sizes of screwed and flanged fittings.

U. S. Geological Survey Announces Personnel Changes

The Information Service for the United States Department of the Interior released for the information of operators and holders of public land oil and gas leases, the following changes of personnel:

Harold G. Barton, formerly supervisor of oil and gas operations for the California region, with headquarters at 533 Post Office and Court House Building, Los Angeles, whose supervisory territory embraced the State of California and the Territory of Alaska, has been transferred to Washington, D. C., to assume the duties of Chief of the Oil and Gas Leasing Division.

Leroy G. Snow, formerly supervisor at Roswell, New Mexico, has succeeded Barton as Supervisor for the California region.

Signal Oil Company Names New General Manager of Divisions

Back on the job after nearly five years of war service with the 143rd Field Artillery Battalion which, under his command, saw action in Guadalcanal, New Britain and the Philippines, Col. W. H. Nickell has returned to Signal Oil Company to take up his new duties as General Manager of Divisions.

W. H. Nickell

Following the successful operation of his own distribution company controlling a chain of 40 service stations in Alameda County, Mr. Nickell sold out his interests to the company in 1932 and became General Manager of all Signal service stations. In 1933 he became Manager of the Central Division, which position he held up to the time he entered the service.

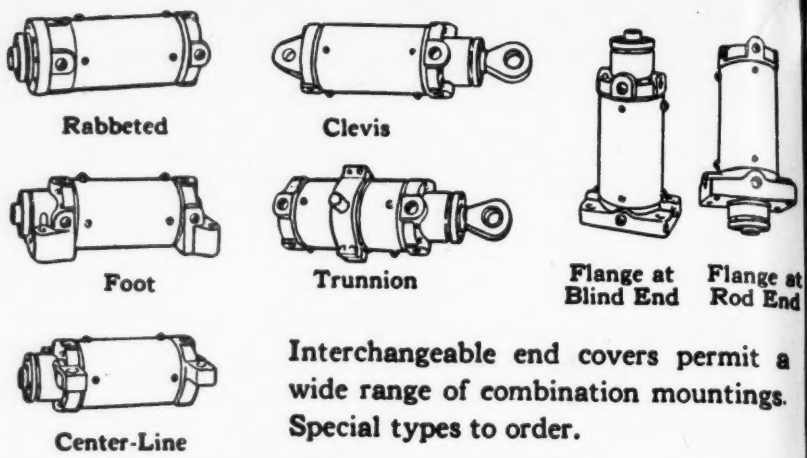
Logansport Announce New Lines

Cylinder Barrels Are Centrifugal-Cast; "O" Ring Seals Employed; No Tie Rods or Gaskets; Automotive Type Piston Rings; For Oil or Water Service at Pressures to 1500 p.s.i.

Maximum power without leakage and lasting accuracy of bore dimensions result from the centrifugal-cast barrels and other advanced features of the new, improved Logan "Rotocast" Hydraulic Cylinders. A complete line of these cylinders has just been announced by the Logansport Machine Co., Inc., Logansport, Ind., manufacturers of air and hydraulic equipment.

Making efficient use of smooth-operating hydraulic power, "Rotocast" Cylinders are adapted for a wide range of operations involving pushing, clamping, lifting, forcing, holding, pulling, pressing and other power movements in any direction. They will permit improved product efficiency with lower operating costs when incorporated in hydraulic equipment offered on the market. They can also be used advantageously on new or old equipment in manufacturing and processing industries, material handling and many other applications in diversified fields. The smooth, clean lines harmonize with the modern styling of today's industrial equipment.

To fit the greatest number of applications, standard "Rotocast" Hydraulic Cylinders are offered in 7 mounting types, 3 piston rod models and 9 standard bores. They are available with cushioning at one or both ends if desired. Although designed primarily for oil service, "Rotocast" Cylinders may be used for water service if the water is treated; if untreated water must be used, cylinders of special material can be supplied. These cylinders are built for operating pressures to 1500 p.s.i.



Interchangeable end covers permit a wide range of combination mountings. Special types to order.

7 standard mounting types, as shown.

Centrifugal-Cast Barrels

A number of advanced features and engineering developments are incorporated in the new Logan "Rotocast" Hydraulic Cylinders. Outstanding among these is the unusual dimensional stability of the cylinder bore which results from the improved method of producing the barrel. As indicated by the name "Rotocast", cylinder barrels are centrifugally cast from close-grained grey iron which retains its original dimensional accuracy for the life of the cylinder.

This permits smooth, true bores, honed to a mirror finish, and assures a uniform flow of power with minimum friction and piston leakage. Four automotive type piston rings further contribute to positive operation with maximum power.

The sturdy end covers are made of close-grained alloy cast iron, and are attached directly to the barrel by heat treated socket-head cap screws. No tie rods are employed. The end covers may be rotated on the barrel so as to place the vent ports at the top, bottom or either side. Alternate pipe tap locations, tapped and plugged, are also provided.

Cover attachment holes are standard on all models. This makes the covers of the various types completely interchangeable, and permits a wide range of combination mountings such as flange mounting at rod end with foot mounting at blind end, etc. Standard mounting types include rabbeted, foot, center-line, clevis, trunnion, flange at blind end, and flange at rod end.

"O" Ring Seal Replaces Gaskets

Conventional gaskets have been eliminated in the new "Rotocast" cylinders. In their place, soft synthetic "O" rings are used to provide a permanently leak-proof seal between the cylinder barrel and end covers. "O" rings maintain a perfect seal even though the applied pressure is increased or decreased, and have a far longer service life than the usual gaskets.

Foot mounting and center-line mounting "Rotocast" Hydraulic cylinders have finished mounting surfaces to facilitate anchoring the cylinders by means of keys. The keys do not lay against the mounting surfaces of the covers.

Small tapped holes are provided at various locations in each end of the cylinder barrel. This construction permits locating air vent valves in the position which permits air to be vented or bled from the highest point, regardless of the mounted position of the cylinder.

Texas-To-California Gas Pipe Line Hearing by R. R. Commission

By 1949 the demand for natural gas in California will be 263 million feet a day greater than the amount available from sources within the State unless gas is piped in from other states, according to testimony given before the California Railroad Commission by A. F. Bridge of the Southern Counties Gas Co.

A 26-inch pipe line from Texas and New Mexico to California, built at an estimated cost of $12,140,000, would supply enough gas to offset the shortage. Such a line would have a daily capacity of 125 million cubic feet during the first year of operation, with an ultimate throughput of 300 million feet a day.

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ANNOUNCING

the appointment of

THE REPUBLIC SUPPLY COMPANY
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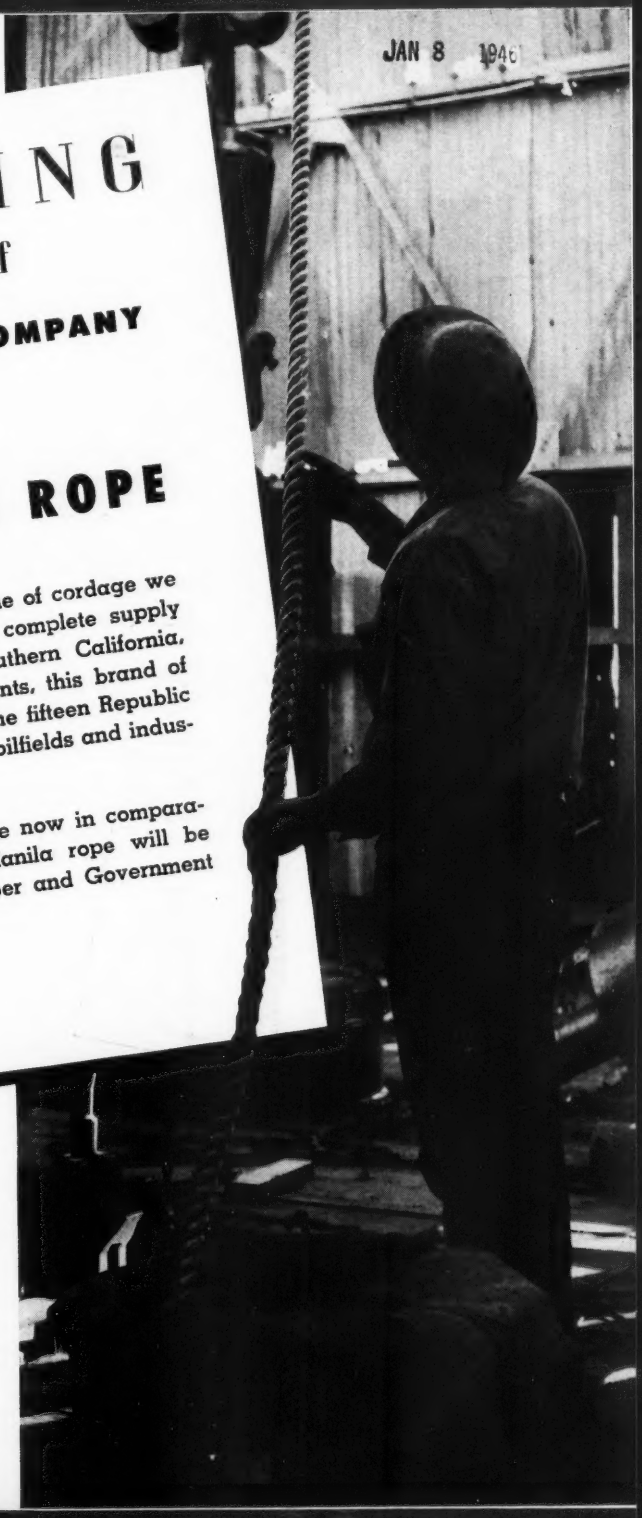
as a distributor of

GREAT WESTERN ROPE

By the addition of the Great Western line of cordage we take another step forward in offering a complete supply service to our customers. Made in Southern California, with a knowledge of Western requirements, this brand of quality rope will be carried in stock in the fifteen Republic stores located in the principal California oilfields and industrial centers.

Great Western Sisal rope is available now in comparatively limited quantities, and pure Manila rope will be furnished as soon as the supply of fiber and Government Regulations permit.



GREAT W

Look for this sign of quality on the covering of the rope you buy.

Distributed by

THE REPUBLIC SUPPLY COMPANY
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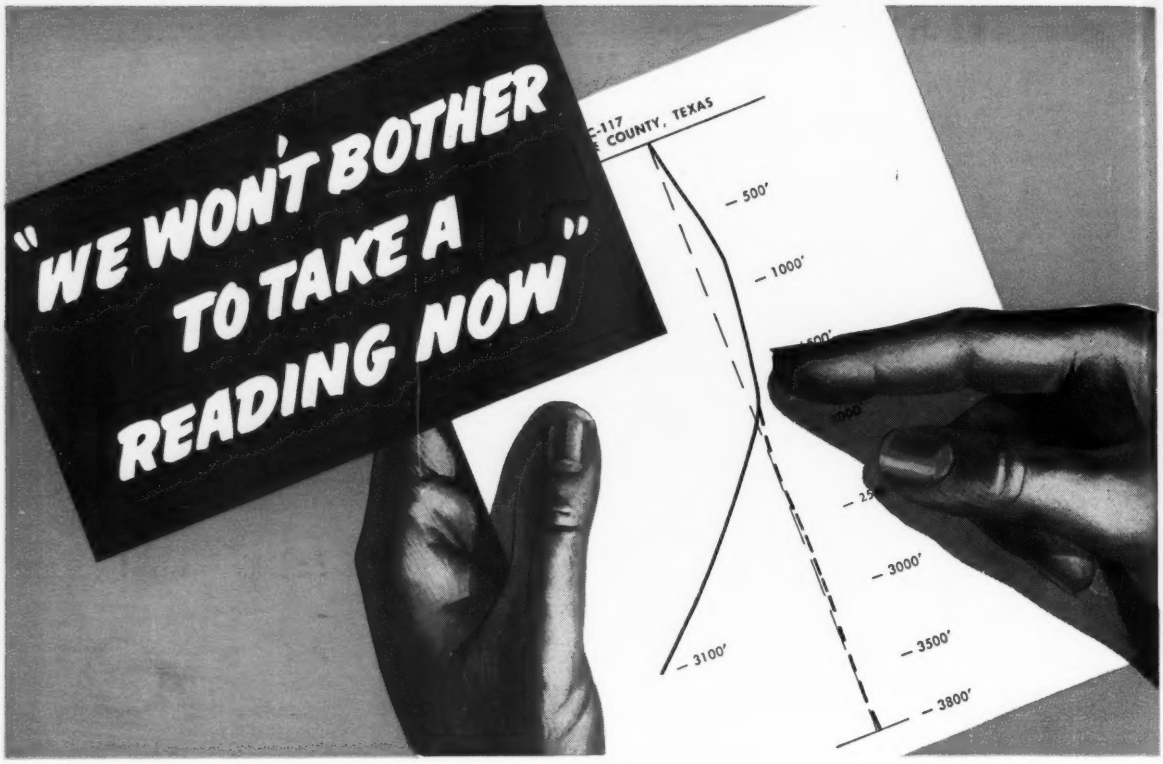


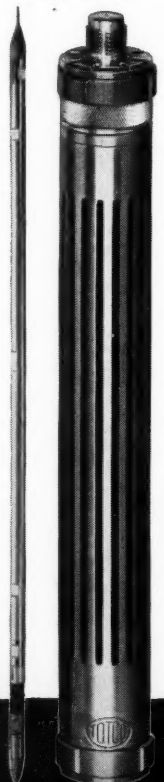
$5530 needless expense started right there.*

BILL
Lost rig time (36 hours waiting for orders, four days drilling new hole)..... $3300.00
Extra fish-tail and rock bits..... 230.00
$5530.00

"Most expensive thing I ever said," the drilling superintendent remarked later. "It was a shallow well — I didn't think we'd need to take readings. But, man, was I **wrong!** The cores we got didn't look right, so finally we took a Totco reading at 3100 feet. And we were better than 9° off!

"There was a lot of discussion about what to do, but the upshot of it was — I had to back up to 1650 feet and start over. No, we didn't have any more trouble — used Totco readings and Totco Controlled Vertical Drilling Methods on the re-drill. Bottomed at 5500 feet O.K., and never as much as 1° off.

"But I'll always remember that 1450 feet of hole I drilled for nothing. Wasted rig time and bits cost $5530 — money down the rat-hole because I didn't use the Totco Recorder and Totco Controlled Vertical Drilling Methods."



Based on actual case records in our files.

TOTCO

TECHNICAL OIL TOOL CORP., Ltd.

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Peace and rest at length have come

All the day's long toil is past

And each heart is whispering "Home,

Home at last"

THOMAS HOOD

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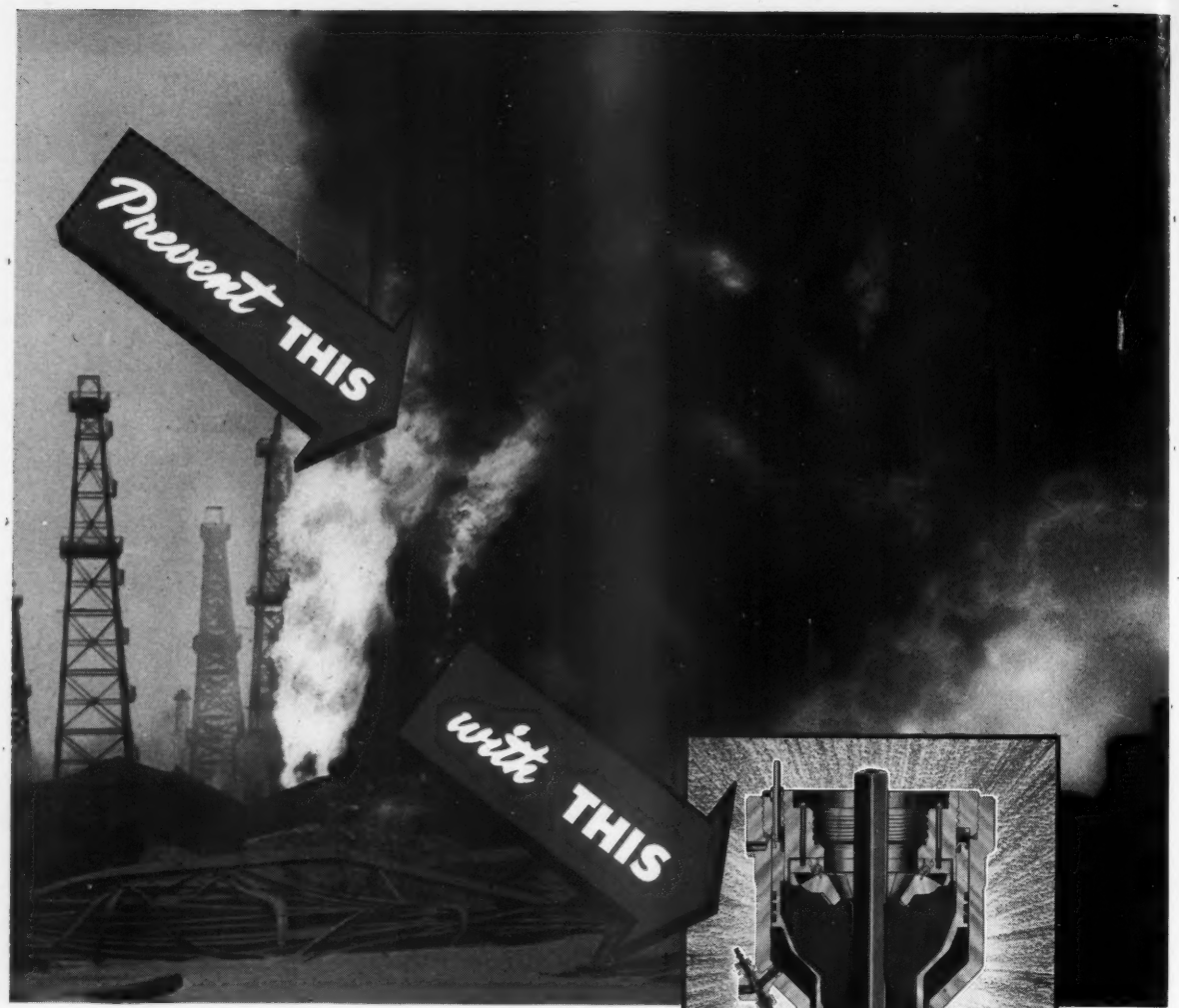
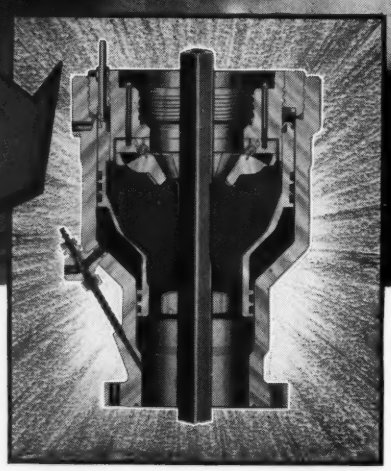
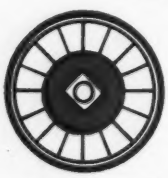
General Sales Offices: Toledo, Ohio. Division Offices: Denver; Ft. Worth; Pittsburgh; Tulsa; Torrance. Export: The National Supply Corporation, 30 Rockefeller Plaza, New York, N. Y., U. S. A.; River Plate House, 12 South Place, London, E. C. 2.



HYDRIL TYPE "R"
BLOWOUT PREVENTER

See how it closes off around
all drill string members.

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Greetings of the Season

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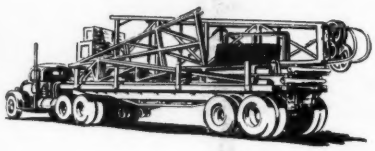
ROLLER BIT COMPANY

EMSCO PORTABLE MAST



RIGGING UP TIME SAVED BY LINE ARRANGEMENT.

Crown and Traveling Blocks are strung before raising the mast and in moving from one location to another, it is not necessary to unstring them.

BULGE GIVES RACKING CAPACITY AND CLEARANCE FOR WORKING PLATFORM.

The patented bulge feature allows racking of the drill pipe inside the mast. It also provides additional clearance for the derrick man's platform and movement of the traveling block.

FOR SAFETY, STABILITY, and MOBILITY

Emsco bulge type Portable Masts are designed and engineered to eliminate the weakness found in most conventional mast designs.

The photograph below shows the visibility from the driller's position.

NO SLACK LINE DURING ERECTION

The Emsco dual pivot feature permits the entire operation of raising the mast to be accomplished with the line in tension. This unique design eliminates the mast falling over center as it approaches its working position. A snubbing line is not needed.

NO INTERIOR BRACING GIVES CLEAR VIEW.

Racking of drill pipe inside the base permits lacing of all four sides of the mast and eliminates interior bracing. The driller can see the derrick man and the derrick man has clear view of the floor.

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